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A GREAT STEAMSHIP COMBINATION.

MR. J. PIERPONT MORGAN HAS SUCCEEDED IN COMBINING SIX IMPORTANT STEAMSHIP LINES—THEY ARE THE WHITE STAR, RED STAR, AMERICAN, LEYLAND, ATLANTIC, TRANSPORT AND DOMINION LINES.

When Mr. Clement A. Griscom's name was included in the directorate of the United States Steel Corporation a great many people wondered; that is, a great many people who were familiar with Mr. Griscom's activities wondered what interests he represented that he should be included in the directorate of a purely steel-making corporation. A few who were in the habit of looking into the future immediately predicted that the interests back of the Steel Corporation would eventually form a steamship combination and that when it was formed Mr. Griscom would be in charge of it. His presence in the Steel Corporation certainly indicated close relations with the powers that control that organization. The prediction has now come to pass. Mr. J. Pierpont Morgan, who is at present in London, has cabled to this country that six lines will form the nucleus of the shipping combination. These lines are the Leyland line, the White Star line, the American and Red Star lines, the Atlantic Transport line and the Dominion line. The Leyland line was already owned by Mr. Morgan and the American, Red Star and Atlantic Transport lines were owned by interests which are closely associated with him, so that the White Star line is to be regarded as the great acquisition. Mr. Griscom has talked freely concerning the consolidation, its purposes and probable effects. He said that the consolidated companies would probably be in operation under the new conditions within a few months. So far as the negotiations regarding the merger are concerned they have been completed. Agreements for a controlling interest in each of the various lines have been secured, and all that now remains to be done is the organization of the holding or parent company. It is possible that the International Navigation Co., whose chartered powers are very broad, will be made the parent company. The question now under consideration is the desirability of this plan as against the organization of an entirely new company to control the operations of the combined steamship lines.

CLEMENT A. GRISCOM, HEAD OF THE BIG STEAMSHIP COMBINATION.

"The capitalization of the consolidated companies," said Mr. Griscom, "will be in the neighborhood of $200,000,000, which sum about represents the property absorbed. Working capital, of course, will be provided, and the profits and reserve fund should enable us to build the necessary additions to our fleets. While control of the company will be held in this country, it will be a strictly international organization, fostering the various companies included in the consolidation, preserving their autonomy, and respecting their national and local surroundings. The object of the combination is to try to give better transatlantic service at a decreased cost. Heretofore the trade has been extravagantly conducted, and we propose to operate more intelligently in the future. We expect in time to inaugurate a system of daily departures from New York, an innovation that is a real necessity. There is no political significance in this deal. The negotiations have covered a period of many years, and I was interested in the subject as far back as 1884. The passage of the ship subsidy bill would have but one effect, so far as the new enterprise is concerned. It would enable us to sail ships now building and hereafter built under the American flag on an equal footing with the ships of other countries.

"The published statements that the ship subsidy bill would enable us to sail our foreign vessels under the stars and stripes are incorrect, as the bill specifically states that only American-built ships can benefit by its provisions, and furthermore such a course, if possible, is contrary to the whole scheme. We have existing only four small vessels that might benefit by the passage of this bill, and they are on the Pacific. While in the coastwise trade, in which they are now engaged, the provisions of the bill would not apply to them. After our present mail contract expires the four American transatlantic liners of the International Navigation Co. are eligible for a new contract either under the present postal law or under any new act that might be passed by congress."

Mr. Griscom denied the statement that Liverpool would be abandoned as a passenger port. He said that question had not been discussed. "Every port," he said, "will be developed along the lines to which each port is best adapted. We will establish an economic and sensible management." Mr. Griscom said it was possible that the company would carry its own insurance. "The consolidation," he said, "will result in better transatlantic service, steadier and more uniform rates, a just distribution of traffic over all American and Canadian seaports, increased lines on the Pacific, and services to South America as traffic may be found to justify them. Having lines between Great Britain and Australia and New Zealand, and intimate connections with the far east, American manufacturers will be able to distribute their products on through bills of lading, and avoid the expense of trans-shipments which they now incur. The products of the farm will be shipped from the seaport most convenient to the point of production. In a word, it is intended to reduce transportation charges as far as possible to every one; to improve facilities, and the company expects to make its increased profits over the conditions of the past from economical management. To what extent these new services will be conducted by steamships built in this country and sailed under the American flag depends upon congress."

Mr. George W. Perkins of the firm of J. Pierpont Morgan & Co. said:

"The combination will be very much like that of the United States

Steel Corporation. Whatever the amount of capital will be it has already been subscribed. The stock of the companies which are to come into the combination will be placed in the treasury of the new combination and stock of the latter will be issued against this stock. The subsidiary lines will retain the names under which they are known and they will continue to fly the flags of the countries under which they are registered. There will be about 208 vessels under the control of this combination as it stands at present, and about two-thirds of these vessels will fly foreign flags. It is possible, of course, that other companies may be taken in, especially the Wilson, the Cunard and the Holland-American lines. This would add more than a hundred vessels to the number controlled by the combination. The other transatlantic lines, especially the Hamburg-American and the North German Lloyd, will act in close harmony with the combination, although they will not be taken in."

In reply to a question as to how the interests of the Morgan railroads would be affected, he said:

"No individual road will receive an interest in this combination, although the railroads dominated by Mr. Morgan will be largely benefited by new facilities for the shipment of their freight for export. It will practically result in stretching our railroad terminals across the Atlantic."

It was later cabled from London that the capitalization would be $60,000,000 in 6 per cent. preferred stock, $60,000,000 in common stock and $50,000,000 in 4½ per cent. debentures.

It is difficult to comprehend the magnitude of the combination. It will mean a fleet of 114 vessels crossing the Atlantic alone and carrying both passengers and freight between American and British ports. The steamships in the fleet will have a combined tonnage of 840,077. Most of the steamers included in the combination are modern, several having been built in the last four or five years. The tonnage of the eleven steamships of the White Star line used in the Atlantic service is 112,875. Among them are the Celtic, 20,900 tons; the Oceanic, 17,274 tons; the Cymric, 12,647 tons; the Majestic, 9,861 tons, and the Teutonic, 9,984 tons. The Cedric, a vessel of 20,800 tons, will soon be added to the fleet.

The four great ships of the American line are the St. Louis, 11,629 tons; the St. Paul, 11,629 tons; the New York, 10,803 tons, and the Philadelphia, 10,800 tons. The largest steamships of the Red Star line are the Vaderland and the Zeeland, each 12,000 tons, and two new ships of the line, each of the same tonnage, are being built, the Finland and the Kroonland. The Leyland line is building the Hanoverian, a 13,000-ton ship, and two 12,000-ton vessels, and owns the Devonian and Winifredian, vessels of 10,400 tons each. All told, the Leyland line is building 61,800 tons of vessels.

The Atlantic Transport line is also building a large amount of tonnage, both in Great Britain and the United States. Besides the Minnewaska and Minnetonka, two 13,400-ton vessels, which will be in service this year—the Minnetonka in June—the Atlantic Transport line is constructing 59,800 tons at Sparrows Point, Md., and Camden, N. J. Two of these are to be as large as the Minnetonka and the Minnewaska. Four of the Dominion line steamers are of 10,000 tons or more burden. The following are the fleets contributed to the combination by the various lines:

LEYLAND LINE—ATLANTIC SERVICE.

	Tonnage.		Tonnage.
Armenian	8,825	Iberian	2,997
Bohemian	5,542	Cambrian	5,626
Caledonian	4,986	Lancastrian	5,120
Cestrian	8,823	Philadelphian	5,120
Columbian	5,088	Chicago	6,438
Canadian	2,911	Virginian	4,195
Bostonian	4,668	Winifredian	10,405
Devonian	10,418	Anglian	5,532
Georgian	5,088		
Victorian	8,825	Total	110,607

LEYLAND LINE—WEST INDIA AND PACIFIC FLEET.

Indian	9,400	Nicaraguan	3,642
Atlantian	9,355	Louisianian	3,042
European	8,193	Darian	3,362
American	8,195	William Cliff	3,352
Colombian	5,613	Costa Rican	3,251
Antillian	5,608	Texan	3,257
Tampican	4,832	Floridian	3,257
Barbadian	4,501	Yucatan	2,816
Jamaican	4,501	Bernard Hall	2,677
Mexican	4,202		
Cuban	4,202	Total	97,859

LEYLAND LINE—BUILDING.

Hanoverian	13,000	Alexandrian	4,600
Kingstonian	7,000	Two on stocks, Belfast	24,000
Colonian	6,600		
Californian	16,600	Total	61,800

AMERICAN LINE.

St. Louis	11,629	Philadelphia	10,800
New York	10,803		
St. Paul	11,629	Total	44,871

RED STAR LINE.

Vaderland	12,000	Haverford	10,000
Zeeland	12,000	Rhynland	3,689
Kensington	8,669	Ohio	3,392
Southwark	8,607	Pennsylvania	3,166
Friesland	7,116	Indiana	3,158
Westernland	5,736	Nederland	2,839
Noordland	5,212	Switzerland	2,819
Merion	10,000	Conemaugh	2,328
Pennland	3,760		
Belgenland	3,692	Total	107,173

RED STAR LINE—BUILDING.

Finland	12,000	Kroonland	12,000
Total			24,000

WHITE STAR LINE.

Celtic	20,900	Teutonic	9,984
Cymric	12,647	Germanic	5,071
Majestic	9,861	Cevic	8,301
Bovic	6,583	Nomadic	5,749
Georgic	10,777		
Tauric	5,728	Total	112,875
Oceanic	17,274		

WHITE STAR LINE—BUILDING.

Cedric	20,800

ATLANTIC TRANSPORT LINE.

Menominee	6,919	Minnetonka	13,401
Mesaba	6,833	Maryland	2,663
Manitou	6,849	Minnesota	3,216
Marquette	6,919	Mackinaw	3,264
Mohawk	4,212	Maine	2,816
Minnehaha	13,401	Montana	2,840
Minneapolis	13,401	Michigan	8,004
Minnewaska	13,401	Europe	5,302
Manhattan	8,004		
America	5,158	Total	126,543

ATLANTIC TRANSPORT LINE—BUILDING.

Four steamers, 8,000 tons each	32,000
Two steamers, 13,400 tons each	26,800
Total	58,800

DOMINION LINE.

Commonwealth	12,097	Columbus	12,097
New England	11,394	Labrador	10,000
Dominion, Englishman, Vancouver and one other steamer			28,161
Total			73,749
Grand total			840,077

Besides these ships the White Star line operates in its colonial service to New Zealand the Gothic and the Delphic, and to Australia the Afric, the Medic, the Persic, the Runic and the Suevic, and in the Pacific service the Doric, the Coptic and the Gaelic.

How thoroughly the ports of the United States and England are connected by the lines taken into the combination may be seen from the following enumeration of them: The routes of the Leyland line are Boston and Liverpool, Boston and London, Portland, Me., and Antwerp, New York and Liverpool, New Orleans and Liverpool, and Liverpool and Barbados, St. Thomas and Trinidad. The ports of the White Star line are New York, Queenstown and Liverpool. The American line operates between New York and Cherbourg and Southampton. The lines operated by the Red Star line are New York, Southampton and Antwerp, Philadelphia and Liverpool and Philadelphia and Antwerp. The Atlantic Transport line connects New York and Baltimore with London, and the Dominion line's ports are Boston, Montreal and Portland and Liverpool. It is is difficult to estimate the value of the steamers involved in the deal. The steamers of the White Star fleet alone cost more than $20,000,000.

Mr. Bernard N. Baker, president of the Atlantic Transport line, in reply to a question as to what benefits his company would receive from the combination, said: "It will do away with all rate cutting. More convenient arrangements for sailings from different ports will also be an advantage. I want to say that there will be no advance or decline in rates other than the changes occasioned by the usual laws of supply and demand." Mr. Baker seems to regard the subsidy bill as dead.

MR. CHAS. H. CRAMP ON THE SHIPPING COMBINATION.

Mr. Charles H. Cramp, the Philadelphia ship builder, according to a dispatch from Washington, sees in the combination of steamship interests effected by Mr. Morgan and his associates a menace to the interests of the American ship builders. In an interview he said:

"The introduction of vast sums of American capital into the Atlantic trade and the acquiring of great steamship lines may properly be a source of congratulation and the subject of national pride, as indicative of the progress of American enterprise and extension of our interests throughout the world. It is, nevertheless, regrettable in the extreme that the vessels of the combination must, in the main, fly the flag of foreign nations, and that in case of war between the United States and the power whose flag they fly, vessels owned so largely by American citizens can be taken possession of by the enemy and utilized against the country of which their owners are citizens. Nor does the seriousness of the situation end there. Most of the vessels belonging to the lines so consolidated are not of the highest class. I am sufficiently well aware of the character of Mr. Morgan and his associates in this enterprise to know that they will be satisfied with nothing but the best the trade demands, especially the passenger trade, and will be content with nothing but the fastest express steamers, the greatest vessels and the most perfect service.

"Being compelled to compete with the great German lines and their magnificent steamers, the promoters of the merger are left with but two alternatives—either to swallow the German lines or be swallowed by them, or to build faster and more magnificent vessels than theirs. The new American combination must have the best, either by purchase or construction. It is far from my thought to accuse Mr. Morgan and his associates of lack of patriotism. They must bow to commercial necessities, and these necessities under present conditions demand that such great liners, except under unusual circumstances, be built abroad, not only because the original cost of construction is higher in this country, due to higher wages and the greater cost of material, but on account of the difference in operating expenses. It is a fact beyond dispute that ships can be run under foreign flags at nearly, if not quite, 50 per cent. less than under the American flag. On our ships the sailors and officers receive higher wages and better food and treatment. In the life of a ship, averag-

ing, say, twenty years, the difference in cost of operation would amount to 1,000 per cent., which, added to the difference in the cost of construction, makes a figure appalling to those who have not studied the question.

"What then will be the natural result of this merger? American capital, seeking to place its investment on a par with those from abroad, will proceed to equip its lines with splendid express steamers of great cost and magnificence and will build most, if not all of them, abroad. They will be built principallly in English ship yards, and these ship yards will be developed by American capital. Their capacities will be increased, their prestige heightened and they will be enabled to do better work. To what end? That they can construct for their own government greater and more powerful war vessels to be used against the United States should the occasion arise, in conjunction with the American vessels flying the foreign flag."

"Is there no way to obviate this evil?" Mr. Cramp was asked. He hesitated and then replied:

"I am diffident about discussing this subject, for hitherto I have taken little interest in it; but the vastly increased number and dimensions of foreign steamships and their opposition to the American companies, and the continued neglect of congress to accord assistance to the Americans, in view of the disadvantages they labor under from the increased cost of running expenses, was the primary cause of the merger. To further equalize the operating expenses, unless present conditions are modified, they must construct their ships abroad. It is in the power of congress, however, to offset in part the disadvantages under which the owners of American-built ships labor by granting the ship builder and ship owner compensating protection against the outside world. We stand the protection on our lumber, iron, steel, the higher wages of our employees, and there should be some compensation. After all, what the American people are interested in mostly, unless I mistake their feelings, is the growth of the American ship yards, the employment of American labor and the utilization of American materials, resulting in the construction of American ships to fly the American flag. If congress will pass a law to make up in some degree at least the difference in the cost of operating American ships and those under a foreign flag, as contemplated in the subsidy bill recently passed by the senate, the new ships of the merger lines will be built in this country and not abroad. Otherwise American capital will develop foreign ship yards and the dream of an American merchant marine is over, for how long will it be before these gentlemen who are purchasing foreign steamship lines will be buying foreign ship yards in which to construct their new vessels?"

A GREAT TOWAGE FEAT.

The Mariner of London contains an account of the towing of the disabled Cunard liner Etruria from the Azores to Liverpool, which is regarded as one of the most remarkable and unique feats of towage on record. The Mariner says:

"It is a matter of general knowledge how the Etruria on one of her ordinary voyages left New York on Feb. 22, and in due course should have reached Liverpool on the following Saturday, how her non-arrival and the absence of any reports concerning her until five days later occasioned anxiety regarding her safety, and the relief that was experienced when a cable from the Azores intimated that she was in tow of the Leyland liner William Cliff en route for Fayal, having lost her propeller and rudder. But it was not until March 9 that the disabled liner reached the Azores, and meantime the Cunard company had chartered the steamship Elbe to fetch her passengers and mails to Southampton. Then began the heaviest towage on record, for it should be noted that the Etruria is a vessel of 8,120 tons gross, with a length of 501 ft. 6 in., 57 ft. beam, and 38 ft. deep, and the distance from Fayal to Liverpool something like 1,400 miles. But what has contributed to the towage being regarded as a record one is the fact that the Etruria, having lost her rudder, was helpless during the most severe weather, and, as one of the tug masters said, all the tugs in Liverpool could not have kept her in her proper course. Thus she was permitted to drift, the lost ground thus occasioned having to be recovered as circumstances permitted. In shipping circles generally but one opinion prevails, namely, that it has been a difficult undertaking, which has had a successful ending, and to the tugs engaged must be given the credit of having carried out such a magnificent piece of work. These were the Liverpool Steam Tug Co.'s Pathfinder, a paddle steamer, which is without doubt the largest and most powerful tug afloat; the Liverpool Screw Towing & Lighterage Co.'s tug Blackcock, and the screw tug Atlas, belonging to the Azores.

"It was not until March 17 that the towage homewards was begun, the Pathfinder and the Blackcock being in front, and the Atlas astern, steering. The Pathfinder had in use 100 fathoms of 14-in. Manila rope, 30 fathoms of 5-in. wire, and from 15 to 20 fathoms of ship's cable, while the Blackcock made fast with a 12-in. hawser from the Etruria, but this soon parted, and after this the Blackcock made fast one of her own 16-in. hawsers and a 5½-in. wire, which throughout stood the severe strain. For eight days both these tugs held on to the huge liner, and made good headway, but the Pathfinder, on account of her paddles, being regarded as a more effective steerer, was slipped and exchanged places with the Atlas. Experiencing variable weather, which frequently freshened into gales, some anxiety was experienced owing to the difficulty of getting the ship's head off to her course, but this was finally got over by the Pathfinder, and from about March 30 onward, the three tugs kept control over the vessel and made good headway. At 3:15 on April 1 she was reported as having passed the Tuskar rock, and off the Irish coast Capt. Stephens of the Etruria engaged the services of a fourth tug, the British King, which assisted in the towage until the Cunard company's tender, the Skirmisher, was met with off the Skerries on Thursday morning. The latter then made fast to the Etruria, and, with the Blackcock brought the liner safely into the river, but being too late for the evening's tide, she dropped anchor off New Brighton and entered Huskisson dock next morning. The towage, which lasted seventeen days, was uneventful, if the anxiety consequent upon the rough weather at times and having a rudderless ship to manage be excepted. And as showing the little headway which at times could be made, it may be of interest to give the distances run each day as entered in the Pathfinder's log—128, 78, 93, 99, 91, 92, 92, 75, 105, 84, 53, 75, 67, 114, 105, 120, and 52 miles.

OUR TRADE WITH PORTO RICO.

Commerce between the United States and Porto Rico is increasing with phenomenal rapidity, especially since the removal of all tariff restrictions in July of last year. Our purchases from Porto Rico are nearly three times as great as the average during the closing five years of Spanish rule in the island, while the shipments from the United States to Porto Rico are five times as great as the average during the five years preceding the termination of Spanish rule. The receipts of merchandise from Porto Rico at the ports of the United States now range between $5,000,000 and $6,000,000 annually, and the shipments to Porto Rico, which were about $7,000,000 in last fiscal year, seem likely to be $10,000,000 in the present fiscal year ending June 30.

This rapid growth in the movements of commerce between the ports of the United States and Porto Rico is presented by a statement just prepared by the treasury bureau of statistics, which shows that the shipments of domestic merchandise from the United States to Porto Rico in the eight months ending with February amounted to $6,887,052, indicating that for the full fiscal year the total shipments of domestic and foreign goods from the ports of the United States to Porto Rico will aggregate about $10,000,000. The exports from the United States to Porto Rico during the five years ending with 1898 averaged less than $2,000,000 per annum, and thus justify the assertion that our shipments of merchandise during the present year to Porto Rico seem likely to be as much as in the entire five years ending with 1898. Over four-fifths of the merchandise now brought into Porto Rico is drawn from the United States, and a little over one-half of the merchandise shipped from that island is sent to the United States. The total value of goods shipped from the island in the eight months ending with February was $5,787,619, and of this sum $3,016,258, or 52 per cent., was to the United States. The total value of the merchandise received into the island during the same period was $8,418,078, of which $6,887,052, or 82 per cent., was from the United States.

The following table shows the value of the principal articles shipped from the United States to Porto Rico in the eight months ending with February, 1902, compared with those of the corresponding months of the preceding year:

Articles.	Eight months ending with February 1901.	1902.
Rice	$766,028	$1,109,596
Cotton cloths	723,907	831,271
Cotton mfrs., all other	81,206	673,519
Wheat flour	559,928	657,955
Pork products	455,897	614,563
Machinery, etc.	153,664	407,223
Other iron and steel mfrs	154,011	279,356
Fish	168,887	208,331
Boards, shocks and lumber	139,632	202,573
Wood manufactures	65,897	168,299
Chemicals, drugs, etc	53,611	90,025
Beans and peas	23,831	97,223
Dairy products	49,984	88,688
Refined mineral oil	52,635	76,135
Paper, and mfrs. of	37,931	71,499
Boots and shoes	28,927	95,108
Malt liquors	34,429	71,441
Books, maps, etc	24,724	49,280
Cars, carriages, etc	50,422	52,262
Coal	35,787	45,401
Scientific instruments	21,202	43,668
Steel rails	11,080	57,006
Leather mfrs., other	16,116	38,443
Beef products	38,927	39,734
Other meat products	52,022	60,279
Sugar, refined	10,709	45,938
Wool manufactures	5,315	29,054
Soap	16,571	29,878

NEW NAVAL PROGRAM.

Former Secretary Long appeared before the naval committee this week and discussed the building of new ships and other items of naval expenditure. The secretary favored a provision for three battleships, two armored cruisers and several smaller ships, as recommended in his annual report. When asked as to the building of warships in government yards Mr. Long renewed his disapproval of such action, saying that it would cost about 25 per cent. more and that it would have a tendency to build up political organizations at the navy yards. He did not favor the construction of additional submarine boats until the present ones are tested.

After the secretary had finished his talk the committee decided to recommend two battleships and two armored cruisers of the first-class and two gunboats. The battleships are to be powerful vessels. They will have the best Krupp armor protection and their batteries will be stronger than any heretofore adopted for American warships. The batteries for the battleships will embrace twelves and eights in turrets with broadsides of seven and sixes. Each battleship will have a displacement of 15,500 tons and each armored cruisers will displace 14,600 tons. The battleships will cost $4,212,000, exclusive of armor and armaments. The cruisers will cost $4,659,000, this, too, as in the case of the battleships, merely for hulls and machinery. The secretary is authorized, if he so wishes, to build one or all of the ships in the navy yard. The entire naval appropriation is $76,000,000.

Appropriations proposed to be made for Puget Sound navy yard, as they have been prepared by the sub committee of the house naval affairs committee, amount to $970,000. It is probable these will be adopted unchanged by the full committee. The naval bill as it stands at present carries a total for all purposes of $77,719,386.33.

Jones & Laughlin of Pittsburgh have given a contract to the McKeesport Saw Mill Co., McKeesport, Pa., for the construction of fifty barges to be built of Oregon pine. The barges will be used to transport coal to New Orleans.

CANADA WANTS STEEL SHIP BUILDING SUBSIDY.

The boards of trade of the various cities throughout Canada are petitioning the dominion government to subsidize steel ship building. The movement has been noticeable for several months, but it is very insistent now. The following resolution just adopted by the Halifax board of trade is typical of all of them:

"This board notes with appreciation the widespread interest shown in the question of increased Canadian-built tonnage. This board is convinced that the building, owning and operating of a strictly Canadian merchant marine fleet adequate to the transportation of our own rapidly-increasing exports is essential to the continued prosperity of this dominion as a whole; that the people of Canada possess all the elements of maritime ascendancy, as no other country controls more valuable navigable water ways, finer harbors or greater extent of coast line, all presenting unrivalled opportunities for marine traffic; that our people once held a prominent place and had a high reputation as builders and owners of wooden ships, but owing to changed conditions this important industry has fallen into decay until today, notwithstanding our great natural advantages, it is practically extinct; that this board is of opinion that the federal government of Canada should encourage the building of modern steel ships in this dominion sufficiently to place the industry on a parity at least with foreign competition. That there is abundant precedent to guide the government in granting this request.

"All the countries of the world have made the possession of shipping an imperative policy, and directly or indirectly have expended large amounts in encouraging their people to build and invest in merchant marine fleets. France, Russia, Germany, Norway and Sweden and Japan have all done much by direct aid to encourage home-built tonnage. Great Britain, while denying the principle of open assistance, has by the creation of an enormous navy, and by insisting that all the colonies shall allow British-built vessels equal rights and privileges in the coasting trade, done more than any other country to foster this industry and attain the controlling position she now has in the marine commerce of the world. Our aggressive neighbors to the south of us have followed Britain, and by the judicious awarding of large naval contracts have stimulated in that country the establishment of a number of the largest and best equipped yards in the world for modern steel ship building. Not content with their present progress and success, a measure is now before the government at Washington proposing to give $9,000,000 a year for twenty years to aid in the establishment of a great merchant marine fleet to sail under the American flag.

"Apart from any precedent, we believe that the establishment and operation of large ship building plants in the different provinces of this dominion will be a direct and very material benefit to every Canadian interest. It will give employment to the better class of our native artisans (who now too generally seek their livelihood in the United States), increase our population, enlarge our home market for all kinds of agricultural products, and widen and quicken the domestic demand for all sorts of manufactured goods. Every province and territory of this dominion would be directly benefited by this industry; Ontario, Quebec, New Brunswick, Nova Scotia and British Columbia by the immediate impetus to business from the establishment of large works on the shores of their lakes, rivers or oceans, and Manitoba and the territories by improved facilities and consequent cheapening of transportation for their products.

"Be it resolved, therefore, that, in order to encourage the investment of capital and labor in this industry, this board recommends that the government at Ottawa pass a measure granting assistance to steel ship building in Canada, which shall be sufficient in amount to place Canada on a parity, at least, with our chief competitors, and extend over a term of years long enough to fairly establish this industry, so that it may hold its way against outside competition. The information at the command of this board is not comprehensive enough to enable us to determine accurately what amount would be required to fully equalize conditions for ship building in Canada as compared with Great Britain and elsewhere; but from the information at our disposal we are of the opinion that a very substantial bonus will be necessary for a term of years, and we further think that all interests would be best conserved by distributing the amount according to results, i. e., so much per ton on the output of strictly Canadian yards.

"And further, this board would press upon the government the imperative necessity for immediate action in this matter, particularly on account of the disastrous lack of Canadian tonnage on the great lakes for the movement of the grain crops of the northwest. We consider it a serious reflection on our commercial standing as a nation that such a large proportion of the products of our great northwest should be carried in foreign bottoms and through foreign channels. This humiliating anomaly must of necessity continue to exist until our own mercantile marine is adequate to transport our own commodities. That desirable result must be indefinitely postponed unless substantial financial aid is forthcoming, and we trust the government may consider it in the public interest to liberally supplement private effort and thus give an impetus to an industry which will not only give employment to a large number of our own artisans, but also raise the prestige of Canada throughout the commercial world."

LAKE ITEMS IN SUNDRY CIVIL BILL.

Among the amendments to the sundry civil bill made by the senate committee are a number providing for additional aids to navigation as requested by the Lake Carriers' Association. These amendments follow: For establishing a light vessel with a fog signal at or near Peshtigo reef, Green bay, Lake Michigan, $15,000; for a lighthouse depot at Milwaukee, $5,000; for a light and fog signal station at or near Crisp's point, Lake Superior, Mich., $18,000; for construction of a steam tender for use in St. Mary's river and adjacent waters, $75,000; for construction of a steel auxiliary ship with a fog signal to be established on Southeast shoal, Point Au Pelee passage, Lake Erie, $45,000; for maintaining a lightship on Southeast shoal, Point Au Pelee passage, $4,000; for construction of a keeper's dwelling at Calumet pier head, Lake Michigan, Illinois, $7,500; for construction of a keeper's dwelling at Grosse Isle, South Channel station, Detroit river, $5,000; for the construction of a keeper's dwelling at Grassy island, Michigan, $5,000.

ITEMS OF GENERAL INTEREST.

M. B. McDonald, Mystic, Conn., has secured a contract to build a five-masted schooner for Capt. Lucius J. Stevens of Clinton, Conn. Her dimensions are: Length, 240 ft.; beam, 46 ft.; depth of hold, 21 ft.

The Nicholson, a torpedo boat built at the Crescent Ship Yard, Elizabethport, N. J., had her builders' trial this week. She made an average speed of 24 knots. There was no hitch in the machinery and no difficulty of any kind.

The three-masted wooden schooner Brazos was launched from J. S. Beacham & Bro.'s ship yard, Baltimore, Md., recently. She is 135 ft. long, 26½ ft. beam and 8½ ft. deep. The vessel is built of white oak and yellow pine.

No site has yet been definitely selected for the extensive tube plant which the United States Steel Corporation is thinking of erecting, but it is understood that the choice of sites has narrowed down to Lorain, O., and Neville island, near Pittsburgh.

The Moran Bros. Co., Seattle, Wash., has just secured a contract to build two powerful steel tugs, Wyadda and Bahada, for the Admiralty Tug Boat Co. at a total construction price of $100,000. The dimensions are: Length, 90 ft.; beam 19 ft.; depth, 7 ft. 6 in.

Rear Admiral A. S. Crowninshield has tendered his resignation as chief of the bureau of navigation, navy department, in order to assume command of the European naval station. The president has nominated Rear Admiral Henry C. Taylor to succeed him.

The steamer Shawmut, recently built by the Maryland Steel Co., Sparrow's Point, Md., for the Boston Steamship Co., was taken to sea last week to test her ability to meet the requirements of an auxiliary cruiser in time of war. She far more than met the test.

Since the last annual meeting of the Lake Carriers' Association, Capt. George P. McKay, treasurer, has increased the net tonnage enrolled in the association from 874,000 to 920,000 tons. It is his intention to seek to increase it to 1,000,000 tons before the next annual meeting.

The Howards of Jeffersonville, Ind., have assumed control of the marine ways at Mound City. A reorganization of the company was effected with Edward J. Hall of Jeffersonville as president and Major E. W. Halliday of Cairo, Ill., as secretary. Among the changes contemplated in the Mound City plant is the establishment of boat building works.

The circular regarding the proposed retirement of $200,000,000 of the preferred stock of the United States Steel Corporation is reported to be completed. Besides outlining the plan to retire $200,000,000 of 7 per cent. preferred stock and issue $250,000,000 of 5 per cent. bonds, the circular will outline numerous improvements contemplated by the operating officials.

The Halifax board of trade has unanimously adopted a resolution urging the federal government of Canada to encourage the building of modern steel ships in the dominion by passing a measure granting assistance to the builders of ships which shall be sufficient in amount to place Canada on a parity, at least, with its chief competitors. The resolution asks that the bonus be granted at so much per ton on the output of strictly Canadian yards.

The contract of the Saginaw Steel Steamship Co. with the Newport News Ship Building & Dry Dock Co. for a large steel steamer to carry petroleum in bulk, announced in the last issue of the Review, was made through Mr. Samuel Holmes of 66-68 Broad street, New York. The specifications were prepared by Mr. Holmes, who also drew the specifications for the conversion of the steamer Roma into a tanker, and the vessel will class 100 A1 at Lloyd's. The Saginaw Steel Steamship Co. has grown materially since its first two steel steamships were built a dozen years ago.

A Chicago dispatch announces that plans have been made by the South Chicago Furnace Co. for the erection of a $2,000,000 steel plant on the company's property on the Calumet river at South Chicago. A blast furnace is now operated by this company and plans have been made for an additional furnace, as recently announced. Concerning the steel works project it may be said that the telegraphed statement is premature and that the publication of a list of stockholders of the South Chicago Furnace Co. as the persons identified with the proposed enterprise is not correct.—Iron Trade Review.

AROUND THE GREAT LAKES.

Depth of water in the lower Detroit river has been increasing of late and the signals on the coal docks will hereafter show depths up to and including 17 ft. 8 in. It is suggested, however, that for the present vessels should not load deeper than 17 ft. 7 in.

Last fall the steamer Zenith City struck an obstruction in Lake Erie about thirteen miles west of Ashtabula and about six miles off shore. The steamer I. W. Nicholas evidently struck the same obstruction this spring. The hydrographic office is now trying to locate it, and it is suggested, if it should be struck again by a passing vessel, that a buoy be dropped overboard to mark it.

The 3-ft. frame system of hull construction planned by Capt. F. D. Herriman of the Great Lakes Register and fully illustrated and described in the Review of Nov. 28, 1901, is being followed in the building of the Thomas Adams steamer at the Craig ship yard, Toledo, and will be adopted also in the two large steamers to be built by the American Ship Building Co. for the Erie & Western Transportation Co.

Gen. Pass. Agt. W. F. Herman of the Cleveland & Buffalo Transit Co. must certainly rack his brain every spring and fall of late for new pictorial postal card announcements of the opening or closing of navigation. The line of these original cards is now a long one. The card this spring contains a bunch of flowers, large lilies and roses, from which the flyers of the lakes—City of Erie and City of Buffalo—are blooming forth with the wings of butterflies.

Capt. George P. McKay, chairman of the committee on aids to navigation of the Lake Carriers' Association, issues a warning. Last year the gas buoy which is maintained at Bar point by the Canadian government was carried away by vessels four times. The Petrel replaced it, but served notice that if it was carried away again it would not be replaced. Capt. McKay suggests to vessel men that the gas buoy was put there to indicate the channel and not as a target.

THE PASSING OF JOHN HAYS.

John Hays is dead. To the present generation, or to the generation which preceded it, the name probably does not bring a memory; but to those who were active in the early forties it is a name to conjure with. In a modest house at No. 202 Lake street, Cleveland, this old man began his solitary journey upon that road "which to discover we must travel too." He had stood at his post ready for years for the call, as indeed, more than half a century ago, he had stood in solitary vigil with a gun in his hands defending his right to his discovery of the copper deposits of the upper peninsula of Michigan. He was ninety-seven years and seven months old (almost a centenarian), and a most remarkable span for one who had spent his energies so splendidly. If John Hays had not discovered the copper deposits of Michigan someone else would (they were so palpably in evidence), but to him must be given the credit of their commercial discovery, as to Columbus must be given the credit of the discovery of this continent, though Chinese junks had probably blown across the Pacific centuries before. It was vaguely known that there were masses of native copper in the upper peninsula of Michigan. Alexander Henry, an Englishman, had discovered them in the eighteenth century, but was unable to interest capital in their development. This knowledge was permitted to lapse until Dr. Douglas Houghton, the state geologist, surveyed the peninsula and reported evidences of mineral deposits of copper and silver. The Indians, too, had told him stories of the existence of masses of native copper. At this time John Hays was engaged in business in Pittsburgh. He was making a struggle against a long siege of ill health and his physician finally told him that his only hope was in change of climate and manner of life. He had heard, as thousands of others had heard, of the mineral wealth of the remote peninsula of Michigan. Nearly everyone was inclined to dismiss the tale, because it was invariably accompanied with the statement that the copper was native and was practically ready to be used in the arts—a condition which does not usually exist in nature. Hays, however, pondered over the stories and was inclined to take them seriously. He decided to journey to the upper peninsula of Michigan in the joint quest of health and the verification of the stories which he had heard. He easily enlisted sufficient capital to back him in the venture. While small steamers or schooners ran occasionally to Sault Ste. Marie from the lower lakes there was nothing larger than a Mackinaw boat or a birch-bark canoe on Lake Superior. The trip, therefore, entailed more labor than would be necessary now to go around the world. He located and purchased three sections—one at Copper harbor, one at Eagle Hill and one on Portage Lake. He formed what was called the Pittsburgh & Boston Mining Co. In the spring of 1844 he found the famous black oxide vein at Copper harbor and in the fall of the same year he discovered the celebrated Cliff mine, thirty miles west of Copper harbor. In the spring of 1845 he opened the veins of mineral at Copper harbor and took out twenty-six tons of black oxide and shipped it to Roxbury, Mass., where it was converted into blue vitriol. In the same spring he opened at Eagle river a vein on the top of a mountain two miles south of Lake Superior. He went to the base and removed the rock and found about six tons of pure copper. One piece weighed 3,100 lbs. Digging down a little further he found one piece of copper which weighed fourteen tons. A little further yet he and his party were rewarded with a mass of pure copper which weighed eighty-one tons. In eight years this celebrated mine had declared dividends aggregating $2,618,000. Through a strange irony of fate Hays, the discoverer and developer, did not profit in this prodigality of riches. His connection with the company was severed before he had realized more than a modest sum from it. Mr. Hays later endeavored to interest English capital in the Michigan copper industry and took with him to England the mass of 3,100 lbs. of copper which came from Eagle river. He found the English capitalists somewhat skeptical, owing to their unfamiliarity with deposits of this character. They did not believe that copper could exist in any quantity in that state. Later, however, they trusted him with some capital. It is worthy of note that the richest mines in the upper peninsula are not those in which copper exists in a native state in great masses, but those in which it runs in the lowest percentage to the ton. It runs in a percentage so low as to make it unprofitable to work in the known deposits of the world elsewhere; but the rock is so soft that it may be crushed almost with the hand. It can therefore be worked with the utmost ease and rapidity. The sample of ore which Mr. Hays took to England with him is now exhibited in King's college on the Strand, London.

JOHN HAYS.

Mr. Hays is credited with having designed and built the first copper smelting furnace in the United States at Pittsburgh. About the year 1850 he located in Cleveland, occupying the house in which he lived until his death. He engaged somewhat extensively in the coal business and developed several large coal fields. The elusive goddess Fortune, however, had passed him by forever. He was also interested in the trial of the so-called Benton process of making steel. No one recalls Mr. Benton now. Even that great authority, Swank, in his "Iron in All Ages" makes no mention of him; but Benton created a tremendous furore in the iron circles of the country. It was at a time when inventors were feeling about for the process which Bessemer eventually discovered. Benton had thought out the principle of making steel by the application of air to the molten iron and so thoroughly excited were the iron men that stockholders in companies owning enormous deposits in the Lake Superior iron country advocated turning over the entire deposits for the mere privilege of controlling his process in Ohio. The early companies in the Lake Superior country furnished the roasted iron and the experiment was held at Cincinnati. It failed.

Mr. Hays was born at Zelinople, Butler county, Pa., on Oct. 9, 1804. He was married to Miss Susan Gordon Sterling of Pittsburgh in 1846. He is survived by his widow and a son, Oliver Hays. He retained to the last his mental faculties, though he had not left his bed for the past three years. Death came to him painlessly. Indeed the manner of his death was peaceful and beautiful. He passed the day in comparative comfort and then towards evening his eyelids closed for the last time to open again upon "another world than ours." As the direct result of his great discovery hundreds of millions have been added to the world's wealth, though none of it had clung to his own fingers.

PENSIONS FOR THE LIFE-SAVING SERVICE.

The Philadelphia Maritime Exchange has adopted resolutions petitioning congress to pass the bill pensioning officers and enlisted men of the life-saving service and their widows and children. This measure is also receiving consideration in the great lakes district, President Livingstone of the Lake Carriers' Association being now in Washington for the purpose of urging the passage of the bill. The Philadelphia Maritime Exchange in its memorial says:

"That, in the judgment of this exchange, these hardy and faithful men, whose services are rendered at the risk of their health and the peril of their lives for the benefit of others, and whose exertions save hundreds of lives every year besides a vast amount of property, are as worthy of recognition under the pension laws as the soldiers and sailors who stake their lives in defence of their country, particularly as the active service of the life-saving crews is rendered invariably amid danger, while that of the soldier and sailor is not always so; and

"That, the life-saving crews are mainly composed of fishermen of extremely limited means, who, when grown old disabled in the service, have little or no personal means of support and consequently sink into penury or dependence on others, as is actually known to be the fact by this exchange; so that when they lose their lives in attempting to save others, or when they die a natural death, their families are left in poverty and distress; and

"That, the noble record of the life-saving service awakens feelings of gratitude, respect and admiration in the hearts of all, but perhaps appeals most forcibly to those who, having an interest in vessel property and feeling responsibility for the preservation of life and property at sea, are most familiar with the daily lives and sacrifice and courage of these men.

"The Philadelphia Maritime Exchange for the reasons stated, respectfully and most earnestly memorializes your honorable bodies in favor of the passage of bill H. R. 163, granting pensions to certain officers and enlisted men of the life-saving service and their widows and minor children."

PREDICTED EARNINGS OF STEEL CORPORATION.

An official of the United States Steel Corporation, who keeps himself in close touch with the earnings of the constituent properties, estimates that the corporation's net earnings for April will be in the neighborhood of $11,500,000. This estimate compares with $7,356,744 for April of last year. He estimates the earnings for the coming year, beginning April 1, at $130,000,000. Speaking of the general situation he said:

"We are confronted with conditions, the like of which has never before been experienced. The United States Steel Corporation, the Republic Iron & Steel Co., the Tennessee Coal & Iron Co. and one or two other large concerns are trying to keep prices at a reasonably low level in face of the policy of certain independent companies who are forcing all the business they can at topmost prices. The amount of iron that is being sold at the highest price, however, is insignificant as compared with the total consumption, representing no more perhaps than 3 or 4 per cent. of the whole. The big consumers have already contracted for practically all the material they will need this year, and there will be enough iron to go around. It is true that a few foundries have underestimated their demands, and are now anxious to 'cover' their increased wants at almost any price, but even in this field, I understand, the amount of iron likely to be purchased at fancy premiums is comparatively small. I see that the action of the United States Steel Corporation in going outside for billets has created a great deal of talk, but there really is nothing significant in the combine's outside purchases, the total volume of which cannot be considered large when compared with the corporation's average wants."

CARNEGIE OPPOSED TO RECIPROCITY.

That Mr. Andrew Carnegie thinks a gratuity to the Cubans better than tariff reduction is evident from the following communication, addressed to the New York Tribune and dated New York, April 19:

"A member of the republican party, who is not without experience in tariff legislation, craves leave to offer some comment upon the action of the house yesterday regarding the proposed change of sugar duties for the benefit of Cuba. The writer, when in Washington some weeks ago, advised against this form of relief for these and other reasons:

"First—To favor Cuba in this way would offend other nations. It would give good reason for Britain, for instance, to allege discrimination against her, and say to the colonial premiers about to assemble in London: 'See what the United States has done; our possessions upon the American coast are made more worthless than ever by her favoring Cuba. We must protect ourselves; impose preferential duties upon her products in return. She has begun the contest; upon her falls the blame.'

"Second—I also urged that the British people would protest against American manufacturers being given a preferential tariff by Cuba. We saw how the chambers of commerce of the country assembled did in London protest and called upon the foreign secretary, demanding that he insist upon the 'most favored nation' clause in this (to them) serious matter.

"This whole reciprocity scheme is, in the writer's opinion, mistaken. Although he was at first attracted to it while a member of the Pan-American conference, a little experience soon satisfied him that it might be described as 'an art for making enemies.' Suppose, for instance, that we make with one nation a reciprocity treaty; then all the others which are affected thereby become dissatisfied. France would not like to see German textiles admitted here at less duty than her own; Brazil would dislike the products of Argentina favored as compared with hers, and vice versa. Other nations would resent our products entering these countries at reduced duties, and so on through all the world; for one friend we should create ten enemies, and the imposition of custom duties would become a matter of 'the higgling of the market'—a petty scramble among nations, a war of tariffs, never ceasing.

"I submit to our party that there is only one wise attitude for us to take and to adhere to. Equal treatment of all nations, special favor to none. That certain duties now in force can be reduced; that certain changes could be advantageously made in the present tariff goes without saying, but not much, if any, serious injury results from present duties, and we can in due time undertake the difficult task of readjustment. Most careful consideration should precede action. There should be no haste, nor should we adopt piecemeal legislation.

"That we should be most kind to the newest, the Cuban republic, child of the greatest republic, and the bringer of true glory to us as a nation through her independence, all agree, but I submit to our leaders whether a reduction in sugar duties would not benefit only the owners of the sugar, and who these are no one knows, but certainly not the masses of the people of Cuba. I do not know, but I do suspect, that speculators have long since acquired the sugar. A sum voted outright and intrusted to Gen. Wood, whose good work in Cuba gives him enduring place among our great servants, for distribution among the needy would probably reach the result we all have in view far more successfully than the proposed form of relief. Besides, it would have the great additional advantage to us of healing, not further aggravating, unfortunate differences in our party. It does not seem to the writer good politics to persist in an attempt to exact the relief we wish for Cuba from one article or one class which should come from the national as a whole."

BERTRAM ENGINE WORKS CO.'S NEW VENTURE.

In regard to the intention of the Bertram Engine Works Co. to establish an additional ship yard in Canada (stated by the newspapers to be at Burwell) the company writes to the Review as follows:

"We are going to build a branch ship yard, principally for the purpose of building large upper lakes steel hulls, which we cannot build in our present yard, situated here in Toronto, on account of limitations in the Welland canal locks. The actual location of the yard has not as yet been definitely settled, we having at the present time several locations under consideration. It is true that we have orders for ships to be constructed in this yard, for delivery in the spring of 1903, the particulars of which we are not yet ready to publish."

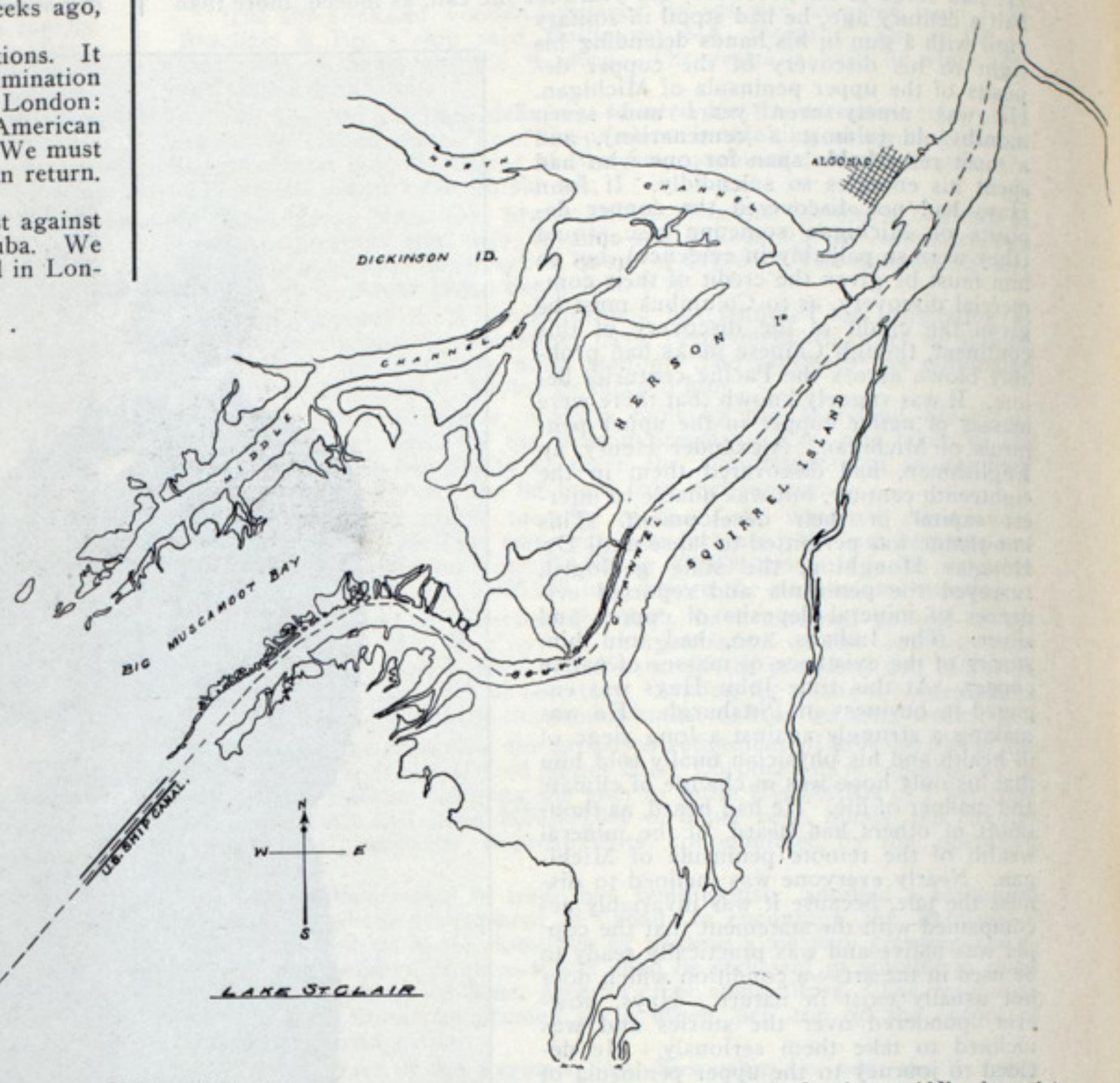
Net earnings of the Boston Towboat Co. for the past year, as shown by a report presented at the annual meeting a few days ago, were $167,746.46, from which a dividend of $67,000 has been paid, the balance being charged to depreciation of the plant and other purposes. During the year the steamship Lyra was completed and is now on her way to the Pacific coast, where the Pleiades and Hyades, both built by the Boston Towboat Co., already are in service. The company was among the first to take up the sea-going barge business but has now discontinued it. The assets of the company are $1,416,911.64.

Representatives of the Bertram Engine Works Co., ship builders of Toronto, recently waited on the council of the Toronto board of trade and requested that body to take up the matter of a subsidy towards steel ship building in Canada. They set forth at length disabilities under which the trade labors at present. A committee composed of the following gentlemen was appointed to deal with the matter: Messrs. W. F. Cockshutt, H. N. Baird, R. J. Christie, C. J. Marlott, J. F. Elles, W. J. Gage and Peleg Howland.

Bids for the purchase of the old receiving ship Vermont, at the Brooklyn navy yard, have been opened at the navy department. L. F. Lunt of Melrose, Mass., was the highest bidder, at $15,658.

THE ADDITIONAL ST. CLAIR SHIP-CANAL.

In its last issue the Review called attention to the efforts which were started by Mr. Don M. Dickinson and others of Detroit to divert the route of the proposed second ship-canal in St. Clair flats. The provision as at present incorporated in the river and harbor bill provides for a duplicate channel paralleling the present ship-canal and appropriates $330,000 for that purpose. Mr. Dickinson and his associates want the old middle channel resurrected and a canal dredged out from its terminus through Lake St. Clair to reach the present channel of navigation, several miles below the present ship-canal. It will entail a far greater sum of money than is necessary to merely parallel the present ship-canal, but Mr. Dickinson argues that it will provide two independent routes of navigation through the tortuous St. Clair river. In order that the situation may be clearly conveyed to its readers, the Review prints herewith a chart of the location.



If Mr. Dickinson's plan were followed it would be necessary to dredge from middle channel to the end of the dotted line. Mr. Goulder's suggested plan contemplates merely a canal through Big Muscamoot bay to connect with the ship canal.

Last week a conference was held in Cleveland between Capt. McQueen, who represents Mr. Dickinson, and several vessel owners. Mr. Harvey D. Goulder has made a report to Mr. William Livingstone, president of the Lake Carriers' Association, as to the result of the conference. Mr. Goulder wrote:

"Capt. McQueen proposes to utilize what is called the middle channel, leaving the St. Clair river at Algonac, running down to the foot of the middle channel, and then making a cut out into Lake St. Clair, thus furnishing a duplicate channel all the way from Lake St. Clair up to the head of Russell's island. This would avoid the meeting of ships around the southeast bend, and in all that section of St. Clair river. I called in a number of the vessel men. They were all naturally opposed to interfering with the appropriation in the river and harbor bill of $330,000 for the channel as heretofore recommended, and they were strongly opposed to any other action than that which should insist upon what we have got after so many years of effort. They oppose setting that aside for something new and which would require a whole lot of investigation. Of course it would be simply out of the question to talk of substituting this middle-channel project in the present river and harbor bill; all that could be done would be to strike out our provision and have a preliminary survey of this other channel authorized. Then would follow perhaps as much delay as we experienced in getting what is now in the bill. Even then there would be involved all the risk of the channel not proving what the Detroit people hope and expect for it, and the question whether the government would go to the expense, and all that.

"Happily I was able to make a suggestion which was entirely satisfactory to Capt. McQueen and one which he said he would report favorably to the Detroit people. My suggestion was this: That if it should ultimately be determined that the middle channel should be used, a long cut, anywhere from 4 to 6 miles, according to the direction, would be required even from the extreme foot of that channel out into the proper point in Lake St. Clair. I pointed out that rather than abandon that which had already been authorized by the government it would be better to let the cut as now provided for be made from the proper point in Lake St. Clair up to the head of the canal; that is something that we have got authorized, something that will be done promptly and will give the earliest relief. If the middle channel is desirable for the purpose of duplicating and having vessels go up one channel and down the other, then a cut could be made from the head of the canal over into the middle channel. This would

involve a cut of 2 miles only. Thus, instead of involving the abandonment of what we have obtained, the proposed improvement and use of the middle channel, if proper investigation should justify it, would become but a continuation of the improvement in the way of duplicating the channel which the government would already have authorized. To put it another way: If the middle channel project should ever come forward earnestly, its projectors would find that by allowing the duplicate canal channel to be built up as far as the head of the canal, more than half the dredging necessary to their project would have been accomplished, and I convinced Capt. McQueen that the middle channel project would stand in a great deal better position as a continuation of the process of duplicating the channel than it would be if the duplicating process already secured is abandoned and an entirely new project taken up. In every view it seemed so much better to Capt. McQueen that he said he was entirely satisfied; that he would recommend to his people that they abandon any thought of opposition to the project now included in the bill and give up all thought of urging this as a substitute; that they wait at least until the other had become fixed and assured and then take this matter up, if at all, as a continuation of the present project. The gentlemen who were present said that when it came up in that way, and if it appeared feasible, something that could be done at justifiable expense, they would not oppose but would favor the idea of a duplicate channel all the way up to Algonac."

President Livingstone has written in reply to Mr. Goulder indorsing all that he has said. Mr. Livingstone says it would be the height of folly to alter present plans. He is at present in Washington conferring with representatives upon this and other matters.

CARNEGIE TO YOUNG MEN.

We must be pardoned if we quote Mr. Andrew Carnegie continually but the Sage of Skibo has a habit of saying very good things. In an address at the Mechanics Institute, in New York, before the graduating class of the school department of the General Society of Mechanics and Tradesmen he said:

"We should follow the fortunes of the graduates of an institute like this. Competent men should learn all about them. It would lead to much knowledge, and knowledge is a great prerequisite. There are several classes of young men. There are those who do not do all their duty; there are those who profess to do their duty; and there is a third class, far better than the other two, that do their duty and a little more. There is a difference between talent and genius. Talent does what it can; genius, what it must. But it is the little more that makes the difference. There are many great pianists, but Paderewski is at the head because he does a little more than the others. There are hundreds of race horses, but it is those who go a few seconds faster than the others that acquire renown. So it is in the sailing of yachts. It is the little more that wins. So it is with the young and old men who do a little more than their duty. The youth who spends his night after his daily toil in improving himself is the one that succeeds. It is to encourage such that I am here tonight. Such youths as these are the salt of society and the salt of the nation. Now, what do these graduates seek? I suppose some of them want to be millionaires. Well, that is a laudable ambition. Others, I suppose are looking for fame. That is a vainer ambition with more of the spirit of a Hotspur. But the man who works for money alone will not find the happiness, nor will he be a useful citizen. Money never buys satisfaction or happiness, but it does bring many disappointments and creates many jealousies. I believe it to be the duty of every young man to acquire a competence. But, having secured that, his aim should not be to obtain additional wealth or fame, but to endeavor to see of what use he can be to his fellow-beings. If he will do this, his reward will be ample. There is nothing more gratifying than self-approval. You may cheat others, but you cannot cheat yourself. There are many who are lauded today who would be condemned by others if they were known by them as they know themselves. No one can cheat a young man out of success in life. You young lads have begun well. Keep on. Don't bother about the future. Do your duty and a little more, and the future will take care of itself."

SHIP BUILDING NEWS FROM PHILADELPHIA.

Philadelphia, April 23.—The great ship trust coup is naturally the question of the hour among local shipping men and little else can be overheard from the Cramp ship yard up town to the navy yard at League island. In Philadelphia it cannot be said that the announcement of the big deal was a complete surprise. On May 1 last year the amalgamation was foreshadowed at length in the local papers, and although the reports were considered then to be exaggerated, it was nevertheless believed that a general pool of interests would soon materialize. This amalgamation of ship interests is of more than passing importance to Philadelphia, as the Atlantic Transport and the Red Star lines have both extensive interests here, and their augmented business will naturally enhance the city's property. As yet persons prominent in local shipping here decline to commit themselves in regard to the combination. With the one exception of Charles H. Cramp, president of the William Cramp & Sons Ship & Engine Building Co., the heads of the many ship building concerns in this vicinity have remained silent. Mr. Cramp, as related elsewhere in this issue, takes a rather pessimistic view of the big deal.

There is little doubt but that the Neafie & Levy Ship & Engine Building Co. is a heavy loser on its trio of torpedo boat destroyers—Bainbridge, Barry and Chauncey. Although this concern has not yet announced its determination to enter a claim for reimbursement against the government for loss of time and the inconvenience occasioned them by the continual changes made in the original design of these vessels, it is almost a certainty that it will do so. President Matthias N. Seddinger pronounces this the most troublesome species of craft which his company has ever contracted for, and this is the general plaint of all builders engaged thereon. It will be difficult hereafter for the government to secure bids from ship builders for torpedo boats. The Cramp company will have nothing to do with them.

The Russian battleship Retvizan will sail for the Baltic next Wednesday, taking on the ammunition, which has been for several months stored at Fort Miflin, on her way down the Delaware. Capt. E. N. Stchensnovitch and the majority of his staff have been residents of Philadelphia since the summer of 1898 and profess sincere regret at their departure. The commander of the battleship believes this country to be far in the lead in warship construction and has no hesitation in the statement that Russia so regards it. The recent naval appropriation of that country calls for another formidable addition to its fighting fleet, and Capt. Stchensnovitch believes that the keel of another warship to fly the blue cross of St. Andrew will before long go down in the Kensington ship yard. Russia desires swift cruisers of the type of the superb Variag, and Capt. Stchensnovitch is confident that all such in the future will follow the general design of the Variag.

FRENCH NAVAL MATTERS.

A Paris dispatch announces that shortly before the adjournment of parliament last week M. Lanessan, minister of marine, succeeded in persuading the chamber and senate to vote two naval bills of the highest importance. The two laws authorize between now and Jan. 1, 1907, the expenditure of $132,000,000 for putting down new battleships and armored cruisers and $34,000,000 for the construction of dry docks, and for the building and improvement of coaling stations in France and at the French naval stations of Bizerta, Saigon, Diego-Suarez and Daker. Since the Waldeck-Rousseau ministry came into power in 1899 no less than seventy-eight new vessels have been laid down. Most of these are still under construction. Of this number there are two battleships, the République and the Patrie, both begun in 1901; four armored cruisers, the Amiral Aube, begun in 1899, the Jules Ferry and the Léon Gambetta, begun in 1900, and the Victor Hugo, begun in 1901; twenty destroyers, of which ten were begun in 1900 and ten in 1901; four torpedo supply ships, begun in 1899; twenty-five first-class torpedo boats, of which three were begun in 1889, ten in 1900 and twelve in 1901; thirty-one submarine vessels, of which six were begun in 1899, two in 1900 and twenty-three in 1901. The work on the submarines has been so pushed forward as to enable France to have, including the ten submarines already in commission, an efficient squadron of thirty-seven submarines by the year 1903.

An important reform accomplished by M. Lanessan is the separation of the purely military administration of the ministry of marine from the bureaus of construction and supplies. Hitherto the flag officer, who performed the functions of chief of the general staff of the navy, was at once director of the naval and civil cabinet of the minister, and executive chief of the officers and civil employes of the whole department. This extraordinary power and authority formerly enjoyed by the chief of staff has now been curtailed. The chief of staff is no longer the head of the minister's cabinet, and his functions have been subdivided into sections, each under a separate chief. The chief of staff is now intrusted with all that concerns the discipline, instruction and mobilization of the fleet. The administration of the services of armament, equipment and supplies forms a separate section under control of a flag officer, directly responsible to the minister. Matters pertaining to artillery and gunnery are placed in a third section. Torpedo boats and submarines form a fourth department. Naval construction forms a fifth department. Strange to say, all these heterogeneous functions had hitherto been grouped together in one administration under the exclusive control of the chief of staff. Decentralization is what M. Lanessan has accomplished, and in this he has carried out many of the ideas of his predecessor, M. Lockroy, to whom is due the credit of beginning the task of freeing the French naval department from the meshes and coils of red tape that in the last thirty years have thwarted genuine reform and prevented ministerial decrees from having more than a purely documentary effect.

The minister of marine has thoroughly overhauled and reorganized the naval coast defences. Instead of the director of submarine defences having control of torpedo boats, each port is to have an independent authority, amenable solely to the maritime prefect, and through him to the minister of marine. The supply of lieutenants and ensigns for torpedo boats and submarines being insufficient, the master pilots are to have the command of some of the torpedo boats. Hereafter torpedo boats are to be grouped in pairs, so as to assist each other in search of the enemy. The first torpedo boat of each group is to be under the command of a lieutenant or ensign, and the second under a master pilot.

At each torpedo station the force is to be divided into two parts, the first kept fully manned, while the second will only have a crew sufficient to take proper care of the vessels. Only after contact with the enemy by the first division will it be followed up by the second division. The crews will be required to spend three months alternately on board the reserve torpedo boats and on board the active ones, the first division always to have a mobilization of at least five days at the end of each period of three months. Measures are to be taken to test and put on record each month the actual condition and endurance of the torpedo boats and submarines at each station, and also to register their sea speed. Numerous workshops are to be constructed all along the coast, to effect temporary repairs. This new organization is highly spoken of by the naval experts, and is expected to insure an extraordinary efficiency and development of naval coast defences along the whole length of the French seaboard, on the Atlantic as well as on the Mediterranean. The whole coast defence will thus constitute one separate department, intrusted to a vice-admiral.

A salient feature of the new naval construction programme is that far greater importance is attached to the great defensive fighting unit, the first-class battleships. M. Lanessan finds that the commerce destroyer theory, inculcated so vigorously by Admiral Aube, who was marine minister twelve years ago, has resulted in the building of an enormous number of swift cruisers, for which battleships have been sacrificed. M. Lanessan has come to the conclusion that this is not in keeping with modern requirements. The French naval authorities have more confidence than ever in torpedo boats, and are especially proud of their submarines, which are likely to receive still further development in the next two years.

Another radical reform effected by M. Lanessan is the new strategic grouping of the French naval forces in the east. The four hitherto independent naval divisions of the extreme east have been abolished, and all placed under one command, called the naval force of the eastern seas. The vice-admiral intrusted with this important fleet will have two rear admirals under his orders, and the three principal stations of his force are Saigon, Diégo-Suarez and Nouméa.

The Welland canal was opened for navigation April 20.

MARINE REVIEW

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From all that can be gathered in Washington the storm center during the coming week will be the river and harbor bill. It passed the senate with surprisingly little debate, but about $10,000,000 was added to it. Some of these additions are said to be very objectionable and will undoubtedly be made the subject of argument in conference. There was some talk that the president would veto the bill, but this has been run down and found to be without foundation. It was given sufficient credence, however, to cause a delegation from Boston to journey to Washington to find out about it. The delegation had a talk with Mr. Burton, who assured them that the bill stood in no danger from that source. He also told the delegation that he thought the bill would pass substantially as it came from the house. He referred to the senate amendments, saying that they would have to be fought out, but he feared that some of them would have to be allowed. Mr. Burton has really worked like a trojan upon this measure. His labors have truly been monumental, and are, indeed, far beyond the comprehension of most men. He has investigated with the most painstaking research the needs of the rivers and harbors of the country and has endeavored to be fair to all sections. Above all he has been firm in weeding out needless and extravagant appropriations. The position which he holds is one which a man who has not a genius for detail could not possibly occupy. He would be utterly swamped by the multitude of things which have to be attended to.

Senator Hanna, in a heart-to-heart talk with a brother senator in Washington the other day, said:

"If these fool people, some of them my friends and some my enemies, would stop talking about my being a candidate for president, I am confident that I could accomplish something of real benefit to the country in the task I have undertaken to bring about—a thorough and permanent understanding between capital and labor. I am not a candidate for president and do not expect to become a candidate and I want everybody to understand this, so I can go on with the task assigned me by the National Civic Federation without having my motives viewed with suspicion. I would rather be instrumental in bringing the employing classes and the working classes together so that strikes would be minimized, if not wholly abolished, and have credit for that achievement placed upon my tombstone, than be president of the United States."

The senator with whom this conversation was held said that Mr. Hanna was absolutely sincere in his utterances. We have hitherto said that we believed Mr. Hanna's patriotism to be of the deepest character, a quality so pure as to be little comprehended, and we think that the above quotation is good evidence of it. The Review is not among Mr. Hanna's fool friends. It is not going to urge the presidency of the United States upon him, but if it should, in the unfolding of the future, so chance that the nomination falls to him, the Republican party would have a most admirable candidate.

We are gratified to learn that President Roosevelt is considering the advisability of putting a curb on the utterances of Gen. Funston. This person, since his return from the Philippines, has had the loquacity of an open sluice. He has gone about the country expressing, with the utmost garrulity, views of which a school boy ought to be ashamed. In Denver he recently described Senator Hoar, whose anti-expansion views are founded upon a deep humanity, as "suffering from an overheated conscience." Senator Hoar is one of the most charming men in public life. He is, in truth, a fine old gentleman and moves in an intellectual orbit into which the feebler star of Funston can never enter. We are expansionists because we believe it to be part of the white man's burden to elevate the lesser races of mankind and to abolish among them many cruel customs which are founded upon superstition and ignorance; but we don't believe in hanging American citizens who do not indorse the over-sea policy of the United States. We are very sorry that the stirring condition of the time has brought into prominence a number of mere notoriety seekers like Funston.

It has been decided at a conference of Republican leaders of both houses to shelve the shipping bill recently passed by the senate. Two propositions looking to this end are under advisement—one to allow the bill to die quietly in the house committee on merchant marine and fisheries, where it now is, and the other to report it back with a motion to proceed to its consideration in December next. The result of either plan will be the same. The bill will not be considered at this session and that means practically that it will not be passed by the present congress.

SCOTTISH SHIP BUILDING LETTER.

Glasgow, April 14.—An important event of late in the ship building world has been the launch of the new turbine steamer Queen Alexandra, built by William Denny & Bros. of Dumbarton, for passenger service on the River Clyde, and intended to work in conjunction with the King Edward, built by the same firm last year. The second turbine vessel is generally similar to the first one, but is of larger dimensions, her length being 270 ft., breadth molded 32 ft., and depth to promenade deck 18 ft. 9 in. In appearance she resembles a small cross-channel steamer. A long shade deck has been fitted, on which the boats are carried, and upon which passengers are allowed to promenade. The promenade deck itself extends almost the whole length of the vessel, and is fitted with buoyant seats. Between the funnels there is a large bar room. The main deck aft has been fitted up as a social hall for first-class passengers. This social hall is framed in polished hardwoods and upholstered in velvet, the ceiling being finished in artistic tints. Forward of this there is a tea room on the port side, and a ladies' room, with ample lavatory accommodation, on the starboard. Similar accommodation is provided for gentlemen, and in addition a bar. The galley, larder and scullery are situated on the main deck forward of the boiler room, the smell of cooking being kept away from passengers' quarters. The remaining portion of the main deck is used as a shelter for steerage passengers. The lower deck abaft the turbines is entirely given up to dining accommodation for first-class passengers. It is a large airy apartment and is capable of dining about 100 people at a time. Forward of the boiler room on the lower deck a similar but plainer saloon is provided for steerage passengers, the remainder of the lower deck space being set apart for accommodation for the crew. The vessel is steered by steam steering gear, controlled by a wheel on the flying bridge. A powerful windlass, with warping capstan attached, is fitted forward for working the main cables, and a steam warping capstan is fitted aft for warping the vessel alongside piers. The vessel is lighted throughout by electricity, the installation being carried through by the builders on the concentric system. The boiler is a large double-ended one, with a funnel at each end, supplied by Denny & Co. The turbines, of which there are three, are supplied by the Parsons Marine Steam Turbine Co. of Wallsend-on-Tyne. There are one high-pressure and two low-pressure turbines, the high-pressure one being in the center line. Each drives one shaft, the center one having one propeller and the outside ones two, making five propellers in all. The vessel has been built under the special supervision of the board of trade.

Following are facts as to these turbine vessels from data supplied by Mr. James Denny, one of the builders: If the King Edward had been fitted with balanced twin triple-expansion engines of the most improved type, and of such size as would consume all the steam the existing boiler could make, her displacement would have been slightly increased to carry the extra weight of triple engines as compared with turbines. Under these conditions, the best speed they could possibly have got would have been 19.7 knots, against 20½ knots actually done by the King Edward. Thus the increase of speed was eight-tenths of a knot per hour. Two-tenths of this was due to the lesser displacement in the King Edward as a turbine steamer, and six-tenths was due to the superior efficiency of the turbine engine and its accessories. The difference between 19.7 and 20.5 knots corresponds to a gain in indicated horse power in favor of the turbine steamer of 20 per cent.; but it would hardly have been possible to drive the King Edward 20½ knots with ordinary engines at all, owing to the extra weight and the necessarily increased displacement. The attempt to do so could only have resulted in this speed being got at an enormously increased first cost and a ruinous expenditure of coal, etc., on service. As to coal consumption the paddle steamer Duchess of Hamilton and the King Edward results on service had been compared. From the comparison it had been found that the Duchess of Hamilton at 16½ knots burned 16 tons, and the King Edward at 18½ knots burned 18 tons. The Duchess of Hamilton, however, had only compound engines; by the use of triple engines her consumption could be reduced, but even with triple engines, if she were to be driven at 18½ knots on service, her consumption would have been over twenty-two tons, as against eighteen tons in the King Edward, which corresponded to a saving of about 20 per cent. in favor of the latter. This is on the assumption that the Duchess of Hamilton was left as she was in displacement and draught, and that she could have carried machinery powerful enough to ensure 18½ knots on service, but as her speed on trial was only 18 knots, the greater displacement necessary to carry the increased weight of machinery for the higher speed would have resulted in a considerable increase on the coal consumption of 22 tons. It is known that turbine engines, at a much lower power than that for which they are designed, are not so economical in coal consumption as ordinary engines. Up to the highest speed at which the King Edward had been driven, an always increasingly-favorable consumption of coal was found in relation to the speed of the vessel, but there are no means of knowing how far this tendency might reach. Her speed would have had to be reduced to between 17 and 18 knots, as on trial, before ordinary engines, under the same conditions and at the same speed, would burn less per knot of speed; this 17 or 18 knots speed corresponding to about 50 per cent. of the total maximum power of the turbine engines in the King Edward. The upkeep of the turbine engines for the season was very slight. As to cost, even including the royalties charged, turbines are not more expensive than other engines, and with more experience in their manufacture they will ultimately become considerably cheaper. If the Queen Alexandra turns out to be as successful as the King Edward was, it is almost certain there will be a very large application of turbine machinery.

With regard to the economy of steam turbines at low powers, Mr. Parsons, the inventor, says that in Clyde passenger steamers, indeed in practically all passenger steamers, which always run at or near full power, there is no need to study the question of economy at low powers, but in war vessels, most of whose service is performed at cruising speed, when the power exerted is, perhaps, only one-tenth of that at full speed, then this question of economy at low powers becomes of great importance. Arrangements have been made to solve this difficult problem in several different ways. For instance, the number of turbines may be increased, and there is no doubt in Mr. Parsons' mind that they can by this and other means make turbines certainly as economical—probably much more economical—than ordinary engines at the same low power, while at high speeds the turbines would have an advantage of from 20 to 40 per cent.

The Queen Alexandra is the largest passenger steamer ever built for the Clyde river service, and the first three-decker built for that service.

TYPES OF VESSELS VERY MUCH IN REQUEST.

A type of vessel now very much in request is one with large cargo capacity, space and facilities for rapid adaptation to the conveyance of troops and horses, and moderate fuel consumption. Such a vessel is the steel screw steamer Ascot, which Napier & Miller, Ltd., launched recently form their yard at Yoker, for the Britain Steamship Co., Ltd., London. The principal dimensions are: Length, 385 ft.; breadth, 50 ft.; depth, 29 ft. 6 in.; gross tonnage, about 4,350 tons, with a carrying capacity of about 7,200 tons. The vessel will be classed at Lloyd's 100 A, three-deck rule. She has a complete shelter deck all-fore-and-aft, with the usual tonnage openings. Steel deck houses are placed amidships on this deck for the accommodation of officers and engineers, with teak chart and wheel house on the flying-bridge, the crew being berthed forward underneath. The vessel's outfit for working cargo is most complete and includes double derricks at each hatch, and ten steam winches. The length of the hatchways is a special feature, they being all over 29 ft. long. Both 'tween decks, which are 8 ft. high, have sidelights spaced every 10 ft., which enables the vessel to be used for the cattle trade if desired. She is fitted with two pole masts, the topmast being telescopic to suit the Manchester canal, and she is fore-and-aft schooner rigged. David Rowan & Co. are supplying the machinery, which consists of three cylinders, 26 in., 44 in. and 73 in. respectively, with a piston stroke of 48 in. Three boilers, abreast, are single-ended, with a working pressure of 200 lbs. per square inch.

Then take another example. There has just been launched from the Glen ship building yard of William Hamilton & Co., Port Glasgow, a steel screw steamer, built to the order of McIlwraith, McEacharn & Co., Ltd., London, and to the highest class at Lloyd's, under special survey. She is of the following dimensions: Length between perpendiculars, 324 ft.; breadth, molded, 46 ft. 9½ in.; depth, molded, 24 ft. 8 in., with a gross tonnage of 3,350 tons, and net register tonnage of 2,150 tons, and she will carry about 6,200 tons deadweight. This vessel, the Kooringa, is intended for the company's Australian trade, and is fitted up with the most modern improvements for the speedy loading and discharging of cargo, including four Clarke-Chapman steam winches, and four Lynn's friction winches for the quick despatch of coal cargoes. The vessel is fitted up with a complete electric light installation. Spacious accommodation is provided for the officers in the poop and for the engineers under the bridge. Immediately after the launch the vessel was towed to the dock of the Clyde Engineering Co., Ltd., Port Glasgow, where she will be fitted with a set of powerful engines and boilers.

DUBLIN-HOLYHEAD STEAMER OF OVER 21 KNOTS SPEED.

In a former letter I mentioned a steamer built by William Denny & Bros., which has interest for a great many Americans because those will probably travel by her who come over to Europe this year by way of Queenstown, and it is likely that a larger proportion will come this way than usual because of the exhibition at Cork from May to November. The steamer is the twin-screw Scotia, built for the passage between Dublin and Holyhead in the through service of the London and North Western Railway Co. She has just completed her trial trips this week. The vessel is built on very fine lines, to suit the service between Holyhead and Dublin, the draught being limited, so that she may be able to run to time regardless of the state of the tide. She is 338 ft. 3 in. long, breadth (molded), 39 ft., and depth to awning deck 24 ft. 9 in. She is built of mild steel throughout, with straight stem and elliptical stern, and awning deck extending continuously from end to end, above which the boats are carried on a boat deck out of the way of the passenger promenade. The Scotia is elaborately and tastefully fitted, the first-class dining saloon being framed in oak and teak, and capable of dining sixty passengers at once. The ladies' accommodation is extensive. Besides the ladies' cabin on the awning deck, there is a large cabin on the main deck for their special use, framed in polished sycamore, with decorated panels, the ceiling decorated and tinted in gold. A range of staterooms is specially set aside for ladies' use. Forward of the funnels is a smoking room, a large, well-ventilated apartment, framed in polished oak and upholstered in morocco. The floor is laid in ornamental tiles, and the ceiling is panelled in harmony with the general artistic design. All the lower apartments of the vessel are finished in white enamel, and ample ventilation is supplied by means of electric fans. The greater portion of the lower deck forward of the machinery is fitted up for the accommodation of first-class passengers, folding beds with spring mattresses being arranged for night use. For the day passage the beds are converted into sofas. The vessel is supplied with two sets of triple-expansion engines, supplied with steam at 160 lbs. per square inch by eight single engine boilers. There are four cylinders to each set, with cast steel pistons. The trial consisted of a run of 100 miles seawards, and of three consecutive runs from the Cloch to the Cumbrae. The mean speed maintained in these runs was 21.15 knots, which is beyond the guarantee.

DIFFICULTIES OF CLYDE NAVIGATION.

The peculiar difficulties with which the Clyde river pilots have to contend were enlarged upon a few days ago by Mr. Nathaniel Dunlop of the Allan-State line, at a meeting of the Clyde pilot board and the annual muster of the staff of river pilots. Not a complaint has been recorded all the year, during which 6,298 vessels have been piloted by the regular staff, an increase of 190 upon the previous year. The accidents to these were proportionately less than before, the number being fifty-nine, or one in 107 vessels piloted, against seventy-six, or one in eighty in the previous year. This was a distinct improvement, and it was only clouded by the fact that some of last year's accidents had been unusually severe, and in one case attended with loss of life. Mr. Dunlop remarked that several of the accidents were the result of swifter vessels passing slower vessels at speeds or in positions that gave rise to danger. In our comparatively narrow river it is unsafe for a fast steamer, when overtaking another, to pass the latter at high speed, or in a bend of the river, or when a vessel coming in the opposite direction, happens to be near. The overtaken vessel is forced by the one passing her towards the port side of the channel—the side which a vessel coming in the opposite direction must keep in passing—and obviously, unless there is time to regain the starboard side of the river, before the vessel approaching from the opposite direction reaches her, a collision becomes inevitable. It is also a danger for a large vessel to pass another at high speed in any direction, the displacement of water caused by such movement producing a dragging towards one another that almost exceeds belief and often brings vessels unexpectedly into contact. Unfortunately this danger is not always present to the mind when occasion to pass arises, and in the case of vessels passing one another in the same direction the man in charge of an overtaking vessel, as well as the man controlling the overtaken ship, is apt to perform his part as if with "set teeth," the one giving way reluctantly, the other asserting his right to pass regardless of consequences, speed and position not being duly considered. In this way collisions are brought about which Mr. Dunlop says might be avoided. Another source of accident had been noted—that of starting with ships of large displacement, either too early or too late upon the tide. The time chosen should be that which would ensure the greatest possible body of water under the ship on the passage. At this time the run of the tide would be past its greatest speed; the larger volume of water in the river would make greater width in the navigable channel; vessels would steer better when well off the ground; the displacement also, which gives rise to a drag towards a passing vessel, is reduced to a minimum.

The result of another interesting ocean race between three Glasgow vessels has just been reported. Messrs. Browne & Watson's barque, Kilmeny (1,469 tons), left San Francisco for the channel, for orders, on Dec. 17. She was followed on the succeeding day by Messrs. Thomas Dunlop & Son's ship, Clan Buchanan (1,966 tons), and by Messrs. Thomson, Dickie & Co.'s ship, Largiemore (1,786 tons). The first to touch at a British port was the Largiemore at Falmouth on Monday, March 31, after a passage of 103 days. The Clan Buchanan arrived at Queenstown on April 1. The Kilmeny was built by the Troon Ship Building Co., and the Clan Buchanan and Largiemore by Russell & Co., Port Glasgow.

Whatever may be the ultimate effect of the new French scheme of shipping bounties on the maritime trade of France, it is expected to cause a not inconsiderable demand on British ship builders, for a while, at any rate. It is stated that a great increase in French shipping enterprise is likely to arise as a result of the change in the system, under which subsidy is paid, although at a reduced rate, to French-owned vessels built in foreign countries. Already two new companies have been reported, one formed to establish a service in the Mediterranean ports, and the other to compete with British and German ships in China seas, where, however, there is not much room for more at present as the trade routes are pretty well filled up.

While the boiler problem is being wrestled with in both hemispheres, engineers and ship builders will note with interest that the Italian government has just decided to fit Belleville boilers to the two high-speed battleships which they are building. These vessels are being built respectively at Spezzia and Castelamare dock yards, and the machinery has been ordered in the one case from Odero, of Genoa, and in the other from Ansaldo. The power in both ships is 20,000 I. H. P., which gives a ratio of 1.6 H.P. per ton displacement. The highest Britain has ever gone in battleships is 1.3, though in the case of the new vessels just ordered it is 1.1 H.P. per ton. But these Italian vessels are exceptional, as they are to steam at a speed of 22 knots, which is 2½ miles per hour greater than in the case of any other battleship afloat. They are longer than any other battleships. Although displacement is only 12,624 tons, the length is 10 ft. more than in our 16,350-ton ships, namely, 435 ft. The two Italian ships will be protected with hardened armor, but will carry only two 12-in. guns, this deficiency in primary guns being partly compensated for by twelve 8-in. weapons instead of the usual 6-in. guns. The design excites great interest, as to the influence of speed against inferior powers of attack and defence. It is something for a weak naval power to have facilities for running away from a stronger opponent.

GROSVENOR ON THE STEAMSHIP COMBINATION.

Representative Charles H. Grosvenor, chairman of the house committee on merchant marine, does not share the opinion that the steamship consolidation offers an argument against the passage of the shipping bill. On the contrary, he thinks that it removes the last argument against the bill. He takes no stock in the view that by passing the bill the Republican party will be placed in the light of subsidizing a $150,000,000 trust.

"There isn't a ship in that combination," said Mr. Grosvenor, "that can get any subsidy. It is about time the people who are talking so ignorantly about the bill subsidizing a trust learned that fact. The trouble is that they haven't read the bill. Under the bill before the committee not a ship in that combination can get a cent of subsidy. The formation of that combination furnishes the strongest possible argument for the passage of the bill. It deprives the opponents of the bill of one of their main arguments. The passage of the bill will give the only chance for competition against this colossal combination. While the combination is excluded from subsidy, the competitors of the combination will get the subsidy. Unless they do get it they will be unable to compete, and the combination will have everything its own way. People who oppose the bill oppose the surest means of securing competition against that combination."

Mr. Edward N. Hurley, formerly president of the Standard Pneumatic Tool Co., now a director in the Chicago Pneumatic Tool Co., has sailed for London, at which place he will meet President Mr. J. W Duntley of the Chicago company, and complete arrangements for the sale of the International Pneumatic Tool Co. of London to the Chicago Pneumatic Tool Co. Mr. J. D. Hurley, manager of the Chicago company, announces that they received an order a few days ago from one European concern for 150 pneumatic tools. "Our foreign business has increased very rapidly during the past few months," he says, "and there is every indication that there will be a proportionate increase in the future. Mr. C. E. Walker and C. Booth have also gone to Europe in the interest of the company."

The submarine torpedo boat Fulton, after whose model the Viper and Moccasin are being built for the navy, is to be taken to Washington for exhibition before the naval committees of the house and the senate and officials of the navy department. It is said that afterwards the Fulton will be taken to Europe for similar purposes. The Fulton weighs 100 tons, is 65 feet long, and has a depth of 7 ft. Fifteen tons of water are required to submerge her.

SHIP BUILDING IN NEW ENGLAND.

PRESENT PROSPEROUS CONDITIONS RECALL THE GREAT ACTIVITY OF OLD CLIPPER DAYS—A LIST OF THE VESSELS NOW UNDER CONSTRUCTION.

New England and the maritime provinces of Canda are experiencing a revival of ship building which is a reminder of the old clipper days. To be sure all the vessels built or building, or nearly all, are of wood. Only two or three yards in the district are equipped to build vessels of steel. During the past year the Maine ship yards have launched two ships, seven barges, forty-one schooners, forty-one sloops and fifteen steamers, aggregating 106 vessels with a net tonnage of 47,170. The record in the number of vessels is the same as during the previous year, but there has been a decline in tonnage, the figures for 1900 having been 56,403. In 1900 Massachusetts sent forth only 3,068 tons, but in 1901 vessels aggregating 10,593 tons were launched, the same comprising three lighters, seven barges, thirty-six schooners, nineteen sloops and twenty steamers. Connecticut materially increased her tonnage, launching in 1901 vessels aggregating 22,495 tons, against 8,012 in 1900. The maritime provinces of Canada have also made a very creditable record in vessel construction, New Brunswick contributing in 1901 twenty vessels of 1,608 tons, Nova Scotia 101 vessels of 11,832 tons and Prince Edward island, five vessels of 525 tons. In provincial ship yards there have been constructed three barkentines and some sloops, but schooners largely predominate. Maine leads at present in vessels now building or under contract. Including those launched since Jan. 1, Maine's record for 1902 is thirty-five schooners, eight barges, ten steamers and various other craft, and throughout New England and the maritime provinces there are under construction 175 vessels aggregating 100,000 tons. The government contracts, which are not included in these figures, aggregate in value $17,000,000. The Review is indebted to the Industrial Journal for much of the information which follows:

Ship building operations in the Portland and Falmouth districts the past season comprised two steamers, one sloop and one sloop scow, the aggregate tonnage of the four vessels having been 180 tons. The largest steamer, 141 tons, was the Henry F. Eaton, built by the Portland Ship Building Co. Capt. C. W. Howard of Peakes island, built the Comet, a steamer of 23 tons. The Portland Ship Building Co. is building a schooner 70 ft. long for John Willard and others.

Bath has enjoyed a busy season and the outlook is promising for the future. The record for 1901 is two ships, fourteen schooners, three steamers, seven barges and three sloops, aggregating twenty-nine vessels of 26,392 net tons. Since Jan. 1, 1902, there have been launched the schooner Prescott Palmer, 2,307 tons, built by the New England Co.; the schooner Lizzie M. Parsons, 571 tons, built by the Kelley Spear Co., and the steel ship Atlas, 3,006 tons, built by Arthur Sewall & Co., aggregating 5,884 for the three vessels. In course of construction there are five schooners, three steamers, three barges and one yacht, with an estimated gross tonnage of 18,732 tons. At the New England Co.'s yard a new sidewheel steamer for the Eastern Steamship Co. is nearing completion. Her length will be 275 ft., beam 40 ft., and depth 14 ft. She will contain 190 staterooms and is designed for service on the Kennebec from Gardiner to Boston. She will be launched about May 1 and go into service in July. The firm is also building a three-masted schooner 142 ft. long, 35 ft. beam and 14 ft. deep, to be launched about June 1. In addition to the above the company has in contemplation the building of two four-masted schooners of about 185 ft. keel and two large coal barges of about 225 ft. length with 35 ft. beam and 18 ft. deep. One of these will be designed by Crowninshield, the famous marine architect of Boston, and will be called the Robert A. Stevenson, her managing owner being Edwin P. Boggs, commodore of the Hull-Massachusetts yacht club.

The Kelley, Spear Co., Bath, Me., is now building at its ship yard two coal barges for the Staples Coal Co. of Taunton, Mass. The vessels have 263-ft. keel, 46-ft. beam and 19-ft. depth, with a carrying capacity of 4,000 tons each. The firm is also building a steamer for the Maine Central Railway Co. for use on the Bar Harbor line. She will be 175 ft. long, 30½ ft. wide, 10 ft. deep and is a duplicate of the Sappho. She will be fitted with all modern improvements and in every respect a first-class passenger boat. In addition to the above mentioned vessels a tow boat is now under construction for the Commercial Tow Boat Co. of Boston, her dimensions being 102 ft. long, 20 ft. beam and 11½ ft. deep. Her frame is of oak with oak planking. She is of the propeller type with steam steering gear, etc., for use in Boston harbor.

Arthur Sewall & Co., Bath, Me., launched during 1901 two steel ships, the Acme and the William P. Frye, while early this season a still larger ship of steel, the Atlas, entered the water, the tonnage of these three ships being, Acme, 2,987 tons; William P. Frye, 2,998 tons; and Atlas, 3,006 tons. In the Sewall yard there is now being constructed a steel five-masted schooner 250 ft. long, this being the 105th vessel built by the Sewalls and the fiftieth by the firm of Arthur Sewall & Co. This is the eleventh steel vessel built by the Sewalls and the first five-masted schooner to be of steel construction. A steel oil barge is now in process of construction here for the Standard Oil Co.

Percy & Small, Bath, Me., have work well under way on a six-masted schooner. Her gross tonnage will be 2,900 tons and she will be about 100 tons less than the six-masted Eleanor A. Percy, built at the same yard. This will be the third schooner of its kind in the world and is being constructed for J. S. Winslow & Co. of Portland. Percy & Small also have on the stocks a five-masted schooner soon to launch.

At the yard of G. G. Deering, Bath, Me., a three-masted schooner is well under way of the following dimensions: 150 ft. keel, 36 ft. beam and 12½ ft. deep. She is for Weston & Co. of Jacksonville, Fla. An additional vessel is to be built at this yard the coming summer and the frame is now being cut in Maryland. She will be a five-master for G. G. Deering and is designed for the general carrying trade.

The great ship building plant of the Bath Iron Works is a very busy place. The steel yacht Pantooset was recently launched. This splendid craft is 211 ft. long, fitted up in the most approved manner, and is for A. S. Bigelow of Boston. A large amount of government work is in hand and the working force will soon be increased by several hundred hands. Among the contracts in hand for the United States navy are the battleship Georgia, cruiser Cleveland, monitor Nevada and two steel caissons, these contracts aggregating many millions of dollars.

At the Houghton yard, Bath, Me., Capt. James Hawley is laying the keel for a four-masted schooner of the following dimensions: Keel, 160 ft.; beam, 36 ft.; depth, 13 ft. The frame is of native hardwood with hard pine planking. She is for Capt. Fremont Kimball of Bath. F. S. Bowker is building at Phippsburg a three-masted schooner 142 ft. long for southern parties.

In the Wiscasset district there were launched during 1901 eleven vessels with a tonnage of 760 tons. Six of these were schooners and three were steamers and the remainder sloops. All were built at East Boothbay excepting one small sloop. There are now building at East Boothbay the schooner Margie Turner, 80 tons, and the schooner Marion E. Turner, 85 tons, both by W. Irving Adams. Both of these craft are nearly ready for launching.

A. & M. Gamage & Co., South Bristol, Me., are building a wooden steamer 80 ft. long for the Demariscotta Steamboat Co.

There were launched in the Waldoboro district during 1901 forty vessels of 11,376 tons, Waldoboro ranking second among Maine districts in the volume of vessel construction. George L. Welt, Waldoboro's enterprising ship builder, has a five-masted schooner on the stocks which is to be completed and launched about July 1. She is 154 ft. long, 44 ft. beam and 25 ft. deep. The frame is of Virginia oak and will be planked with hard pine. The interior finish will be of quartered oak and mahogany. She is of the semi-composite type, with a belt strap of iron 6½ in. wide by ¾-in. thick extending around the vessel above the water line, and she is cross strapped with 3½ by ½-in. iron bands, 9 ft. apart. Mr. Welt has another vessel under contract for the same party which will be the largest ever built at this yard. Both vessels are for William F. Palmer of Boston.

Washburn Bros., Thomaston's enterprising ship builders, during the past season launched two schooners, the Joseph E. Ray of 1,062 tons and the James Pierce of 1,520 tons. They are preparing for an active season and will build two large schooners during the present year.

Cobb, Butler & Co. of Rockland have recently launched a schooner of 360 tons, bearing the name of Marion N. Cobb. During 1901 they constructed two schooners, the Rebecca Palmer of 2,125 tons and the Jacob M. Haskell 1,362. Cobb, Butler & Co. will undoubtedly build one or more vessels this year. There is talk of a schooner being built at Vinalhaven. It is to be a three-master of 400 tons, to be built by Capt. Webster at Pleasant river. The keel is to be gotten out at Waldoboro.

In Belfast district there were launched in 1901 five vessels of 4,029 tons. Two of these were schooners built by Camden's veteran builder, Capt. H. M. Bean, the Arthur Seitz measuring 2,200 tons and the J. C. Strawbridge 758 tons. Carleton, Norwood & Co. built at Rockport the schooner Annie, 512 tons, and George A. Gilchrist, at Belfast, the schooner Henry B. Fiske, 745 tons. G. A. Gilchrist of Belfast has now under construction a sea-going dredger for the United States army engineers for use on Cumberland sound. The hull is of native oak and her dimensions are: Length, 200 ft.; beam, 40 ft.; depth, 20 ft. The machinery consists of single screw propelled by one vertical compound-condensing engine with 22 and 44-in. cylinders and 30-in. stroke, supplied by two return-tube boilers of 14-ft. diameter, 12 ft. long and 125 lbs. steam pressure. The vessel has two large centrifugal dredging pumps. The engines and other machinery will be supplied by the Bath Iron Works, and about ten tons of castings will be furnished by the Belfast Foundry & Machine Co. The vessel will be completed and launched in June.

Carleton, Norwood & Co. of Rockport are laying the keel for a four-masted schooner of 1,200 tons. The frame is of Virginia oak and the size of the vessel will be 200 ft. long, 42 ft. wide and 19 ft. 6 in. deep. She will be supplied with steam hoisting gear and all up-to-date improvements. This is the sixty-fourth vessel built by this firm.

F. C. Pendleton of Belfast, Me., has the molds in the woods for a schooner of about 800 tons to be built at Belfast this season.

Capt. H. M. Bean of Camden, Me., is now absent in California, where he has been for some weeks, but upon his return in the early spring will actively resume ship building operations and doubtless one or more large schooners will be built in the Bean yard during 1902.

During 1901 no new vessels were built in the Bangor district, but the record of 1902 is to be a very creditable one. It is nine years since E. & I. K. Stetson launched from their Brewer yard the barkentine T. J. Stewart, and after these years of quietness so far as new vessel construction a four-masted schooner is to be built. The keel will be laid in April and the dimensions will be 175 ft. long, 38½ ft. beam and 18½ ft. deep. She will have a hardwood bottom, and the rest of her frame will be shore spruce from Nova Scotia, cut last year for McKay & Dix, who intended to put it into a vessel of their own at Verona. The keel will be gotten out by John Littlefield & Son of Brewer, in northern Maine, while the spruce frame will be brought up from Bucksport by vessel. The vessel will have two full decks, the upper deck running flush the whole length of her, with a high rail. A novelty in her construction will be the entire absence of knees, instead of which will be put in heavy belt strakes, locking into the deck beams, bottom and top. Work is to be pushed vigorously and it is expected this four-masted schooner, the first of her rig to be built in the port of Bangor, will be launched in October. Her tonnage will be about 825 net. Crowell & Thurlow of Boston will be the managing owners.

The late Capt. S. H. Barbour of Brewer was a famous steamboat builder and now his sons—George H. and Henry W.—under the firm name of Barbour Bros., are likewise achieving distinction in this role. They have been building during the winter in their Brewer yard a steamboat for excursion uses on the Penobscot and she will be launched about May 1. The craft is 124 ft. long, 28 ft. wide and 9 ft. deep. She will register 149 tons gross and 101 tons net. In construction the steamer deviates materially from the lines of the Cimbria, the Sedgwick or the Tremont, the model for the old City of Bangor, designed years ago, being used. She will be largely open, there being but one small cabin, on the main deck amidships. The saloon deck will be entirely free, with the exception of stanchions, and will extend from the extreme stem to stern. The pilot house and officers' rooms will be on the hurricane deck. By this arrangement passengers will have the entire sweep of a great deck without a single obstruction. The best of material is used in the construction of the new steamer and she will be fitted up in the most approved manner. Her machinery is to be powerful and she is expected to be speedy. The new steamer will be christened Verona and will be commanded by Capt. George H. Barbour. She will have a passenger carrying capacity of 500 and will be run by the Barbour Steamboat Co., a corporation recently

organized and of which Henry W. Barbour is president and treasurer, and George Barbour general manager. The Barbour Bros. are also building a small steamer for F. A. Fowler of Norcross, the craft being intended for passenger service on the twin lakes. She is 45 ft. long and 11 ft. wide, and is to be completed by May 1. The steamer will be shipped to Norcross by rail over the Bangor & Aroostook railroad. The Barbour Bros. also have in contemplation the construction of a yawl boat 45 ft. long for Bangor parties.

T. F. Cassidy & Son, owners of the Hathorn ship yard, Bangor, are undecided as to whether they will build this season. Should they build a vessel it will be a three-masted schooner of about 700 tons.

No ship building is as yet decided upon in the Castine district for 1902. The principal operations last year were conducted by McKay & Dix of New York at Bucksport. Late in the season they launched the schooner James W. Paul, this craft enjoying the distinction of being the smallest five-masted schooner ever constructed. Her dimensions are: Length, 230 ft.; breadth, 43 ft.; depth, 21.9 ft.; and tonnage, 1,653.

Three vessels were built during 1901 in Machias district, two of these at Millbridge. The Frances E. Tunnell was the largest of the three and was built at Millbridge by Warren Sawyer, her tonnage being 1,239. Sawyer Bros., also of Millbridge, launched the schooner Lejok, 297 tons, and E. I. White, at Machias, built the schooner Emily I. White, 296 tons. There will doubtless be ship building at Millbridge and perhaps at other points in the district during 1902. W. G. Baker of Machias is building a sailing yacht for New York parties, the model being similar to the Verdi, built by him not long since. Sawyer Bros. of Millbridge have a three-masted schooner of 300 tons on the stocks for sale and contemplate building two other vessels of about the same size.

Ship building of late years in the Passamaquoddy district has been confined to small craft. During 1901 there were built one schooner, four sloops and two steamers, aggregating seven vessels of 108 tons. The steamers were both built at Lubec by Lyman Pushee and were named respectively Campobello and Eastport.

Since the opening of 1902 there have been launched in the Stonington district two schooners. One of these is the Charles H. Klinck, launched at Noank Feb. 11, and registering 444 tons. Her dimensions are as follows: Length, 150 ft.; breadth, 35 ft.; and depth, 12 ft. M. B. McDonald was her builder. At West Mystic there was launched in February the five-masted schooner Jennie R. Dubois the largest vessel ever built in Connecticut. The Dubois registered 1,952 tons and was built by the Holmes Ship Building Co. William H. Hodgkins of Bath was master builder and she will be commanded by Capt. E. H. Smeed of East Providence, R. I., formerly of schooner Gen. S. E. Merwin.

The ship building works of the Robert Palmer & Son Ship Building & Marine Railway Co. at Noank is one of the busiest places along the Atlantic seaboard. From this yard there were sent forth in 1901 about 16,000 tons of new vessels, and the contracts in hand for 1902 aggregate 17,943 tons, as follows: Car float, L. M. Palmer, 890 tons, delivered; car float, Starin line, 840 tons, delivered; schooner barge Herndon, 1,763 tons; two car floats, 1,100 tons each, for the New York, New Haven & Hudson River Railway; two car floats, 880 and 810 tons, for Erie Railway; two car floats of 1,220 tons each and four of 810 tons each for New York Central Railway; three car floats of 900 tons each for Central Railroad of New Jersey; one lighter of 230 tons, one lighter of 220 tons and four lighters of 200 tons each for Manhattan Lighterage & Transportation Co.; two tugs of 160 tons and 120 tons for White Star Towboat Co., and a steamer of 650 tons.

In the Hartford district there are now two barges on the ways at the yard of Messrs. S. Gildersleeve & Sons of Gildersleeve, one of which is finished and the other nearly so. The Messrs. Gildersleeve will doubtless build this year about the same number of barges as last.

The Eastern Ship Building Co. at its big plant near New London are pushing work vigorously on the two mammoth steel steamships of 21,000 tons each building for the Great Northern Railway for use on the Pacific.

In the Bridgeport district Green Bros. are at work on the four-masted schooner Perry Setzer of 2,000 tons. Green Bros. are also figuring on another schooner.

There were launched from New Brunswick ship yards during 1901 twenty vessels, of which sixteen were schooners and four steamers, their combined tonnage being 1,608. The largest of these were the schooner Malwa, 539 tons, built at Black River, and the Ethyl B. Sumner, 353 tons, built at Harvey. Since the opening of 1902 there has been launched at Tynemouth the schooner Annie M. Parker, 398 tons, Leonard Parker, builder.

In the St. John district a steamer of about 70 tons is being built by David Lynch at St. John, and three schooners of about 100 tons each are building at Grand Lake. There is also a prospect of building a four-masted schooner of about 1,400 tons at Black River. Quite a number of wood boats and small schooners are now in course of construction. At present there is every prospect of a large plant being constructed at St. John for the building of iron vessels. This will be in connection with the dry dock, which will be started in a few weeks and will make, it is claimed, in connection with elevators and wharfage, that port the most thoroughly-equipped for foreign trade north of New York.

In the Chatham district a screw steamer to register about 200 tons is being built at Chatham for the Miramichi Steam Navigation Co. and will be launched early in June. She will take the route on the Miramichi river and bay instead of the present boat, which is too small for the increased traffic. There are eight or ten small schooners on the stocks at Caraquet and Shippegan.

Nova Scotia ship yards sent out during 1901 101 vessels registering 11,832 tons. Of these ninety-one were schooners, three sloops, four steamers and three barkentines. Lunenburg district is in the lead with the largest number of new vessels of any port in the dominion of Canada. Lunenburg district also stood ahead for two previous years and from present indications 1902 will show a similar record. There are at the present time twenty-nine new vessels awaiting registry in that county. Some of these are launched and the others in different stages of construction but nearly all of them will be completed by June.

Parrsboro district stands next to Lunenburg in the volume of vessel construction during the year of 1901 and the outlook for 1902 is equally promising. At Spenser's Island Johnson & C. L. Speicer are building two schooners of 380 tons registry each for themselves, to be launched next summer. At Port Greville H. Elderkin & Co. have well under way a schooner of about 250 tons register for sale to be launched in the spring. Thomas K. Bently at Port Greville has a schooner of about 300 tons register well in frame to be launched about July; he is building her for Hugh Gillispie & Co. of Parrsboro and himself. At Fox River Capt. Isaiah Morris has a two-masted schooner of about 70 tons for himself well along. At Parrsboro Capt. D. S. Howard has a four-masted schooner of about 800 tons register for himself well along, to be launched in the spring. W. R. Huntley is building two barges for the Cumberland Railway & Coal Co. with tonnage of about 600 each. D. A. Huntley is building a tug boat for himself, about 60 ft. keel, and a schooner of about 275 tons register for New York parties. Patrick McLaughlin is building a schooner of about 250 tons register. R. P. Soley and others are building a barkentine of about 600 tons register to be launched in the fall.

At Shelburne there are five vessels on the stocks, as follows: A schooner of 100 tons, building by George A. Cox; a schooner of 100 tons, by John A. McGowan; a schooner of 150 tons, by Arthur Hood; and two schooners of 75 and 98 tons respectively, by Joseph McGill. George A. Cox also expects to build a three-masted schooner of 200 tons at Shelburne.

During 1901 there were built on Prince Edward Island and registered at the port of Charlottetown five schooners with a total tonnage of 525 tons. The largest of these was the schooner Empress, 335 tons, built at Montague. In addition to the above, two or three vessels were quite thoroughly rebuilt. In the line of new construction a brig or brigantine of about 200 tons is being built by Daniel Gordon of Georgetown. A schooner or brigantine of about 150 tons is under way by James E. McDonald of Cardigan. A small schooner of about twenty tons is being built at the western part of the island.

SUBSIDY FOR SAILING VESSELS.

At a special meeting of the board of directors of the Maritime Association of New York resolutions were adopted favoring the extension of subsidies to sailing craft as follows:

"It is admitted by the senate committee on commerce that 'the comparative cost of building sail vessels in the United States and abroad has not been ascertained, because very few are being built abroad, except in France.' A large part of the foreign trade under the American flag is still carried in sail vessels of under 1,000 tons gross register, the cost of constructing which vessels is from 30 to 50 per cent. greater in the United States than it is in the dominion of Canada.. These sail vessels are pioneers of trade that seek out and build up foreign markets for the surplus exports of the United States, and are eventually superseded by lines of steamships after the trade has been established, The depreciation, interest and insurance on the extra cost of building these sail vessels in the United States, as compared with the cost of those built in the dominion of Canada, together with the greater cost of operation under the American flag, due to the higher wages and the larger quantity and better quality of food provided, places such American vessels at a disadvantage equal to not less than 3 per cent. per gross ton per 100 miles sailed in competition with Canada-built vessels. Vessels under 1,000 tons gross register, rated under class A1½ in the Record of American Shipping, and by other classification societies of equal merit, being certified as fit to carry dry and perishable cargoes to any part of the world, are perfectly seaworthy. No type of vessel in existence produces an abler or hardier class of seamen, nor a class more useful for the manning of our warships than these sail vessels. France, seeing the importance of having trained seamen available for her navy, provides in her laws a higher rate of compensation for sail than steam vessels.

"Therefore, the Maritime Association of New York urges upon congress the fixing of such rates of compensation in the shipping subsidy bill now pending in that body as will enable American sail vessels under 1,000 tons gross register to successfully compete with foreign vessels in our foreign trade, and it is the sense of this association that all American sailing vessels under 1,000 tons gross register, and of rating not inferior to A1½, should participate in all of the general provisions of the ship subsidy bill now pending in congress."

SCOTCH AND ENGLISH SHIP BUILDING.

During April Scotch ship builders launched twenty-one vessels of about 35,979 tons gross, as compared with twenty-eight vessels of about 47,210 tons gross in February, and twenty-one vessels of about 36,780 tons gross in March last year. In the three months Scotch builders have launched sixty-three vessels, aggregating about 106,000 tons gross, against forty-two vessels of about 112,350 tons gross in the corresponding period of last year, about 99,930 tons gross in 1900, and about 117,940 tons gross in 1899. English builders in March put into the water twenty-three steamers of about 66,685 tons gross, against twenty-three vessels of about 74,182 tons gross in February, twenty-two vessels of about 85,055 tons gross in March last year, twenty-two vessels of about 69,039 tons gross in March, 1900, and thirty-one vessels of about 89,705 tons gross in March, 1899. For the year, so far, English builders have launched fifty-seven vessels, totalling about 163,310 tons gross, as compared with fifty-five vessels of about 195,705 tons gross in the first quarter of last year, fifty-two vessels of about 135,765 tons gross in 1900, and eighty-one vessels of about 202,864 tons gross in 1898. During the month one vessel of 7,440 tons gross was launched at Belfast, against two vessels of about 11,300 tons gross in March last year. The total launched in the United Kingdom in the three months has been 122 vessels, aggregating about 283,340 tons gross, as compared with 103 vessels of about 318,405 tons gross in the corresponding period of last year, 116 vessels of about 242,195 tons gross in 1900, and 160 vessels of about 361,361 tons gross in 1899.

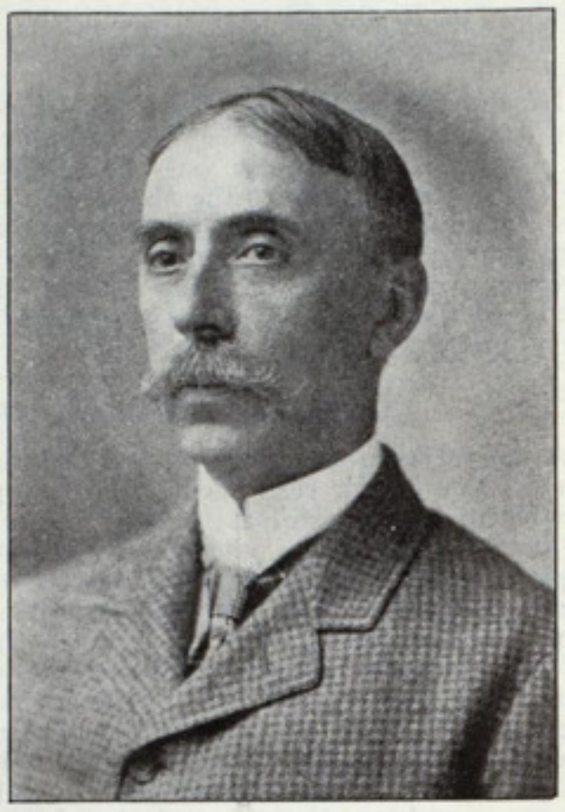
The annual meeting of the Collingwood Ship Building Co., Collingwood, Ont., recently held, resulted in the election of the following officers: J. J. Long, president; A. McDougall, vice-president; Thomas Long, secretary and treasurer; C. Cameron and P. M. Campbell, directors. It is understood that the company will presently lengthen its dry dock to 530 ft. and increase the width to 76 ft.

The torpedo boat destroyer Hopkins was launched at the ship yard of the Harlan & Hollingsworth Co., Wilmington, Del., on Thursday of this week.

TWO GOVERNMENT ENGINEERS.

SKETCHES OF TWO GENTLEMEN WHO ARE ENGAGED IN IMPORTANT CONSTRUCTION WORK IN GREAT LAKES DISTRICTS.

Doubtless at this time sketches of two government engineers who have under way and in contemplation construction work of great importance along the great lakes may be of interest. Major Thomas W. Symons of Buffalo has given much thought to the question of lake levels which is probably the subject of greatest interest to vessel men today. The level of Lake Erie has steadily been falling during the past twenty years, which is undoubtedly due to the diversion of natural currents and the creation of artificial ones. Major Symons has come to the conclusion that the remedy lies in the construction of a dam at the outlet to Lake Erie—a view which is shared by every one who has given the subject consideration. The present river and harbor bill, as the Review has hitherto related, appropriates $20,000 to pay the expenses of a preliminary commission to consider jointly with a Canadian commission the advisability of constructing the necessary dam. The members of the committee on rivers and harbors are a unit in favor of this remedial dam. With determined action on the part of the government engineer and the earnest and sympathetic support of the committee on rivers and harbors it is more than likely that actual work may begin upon this project within two or three years.



MAJOR THOS. W. SYMONS.

Major Thomas W. Symons was born in New York. He was appointed to West Point from Michigan in 1870 and graduated in 1874 at the head of his class and was assigned to the corps of engineers, in which he has done duty ever since. He has had a wider ranger of duties than fall to the lot of most officers of this corps. His first duty after graduation was at Willett's Point, where he became familiar with the torpedo system of defence adopted for the United States. At this time there were extensive surveys being conducted in the west under the general charge of Lieut. George M. Wheeler, and Lieut. Symons was assigned to this work, on which he continued until 1879. His field of operations was Nevada, Northern California, Oregon, Washington and Utah. Over this great area he carried a topographical survey, based on primary and secondary triangulation referred to astronomically determined positions.

In 1879 Lieut. Symons was sent to the department of the Columbia as chief engineer of the department and as such served on the staffs of Gen'ls O. O. Howard and Nelson A. Miles. His duties consisted largely in selecting and locating military posts, building roads and making surveys and reconnaissances. Under authority from Gen. Miles he made a thorough examination of the Columbia river from our northern boundary to the known portion below the mouth of the Snake. Accompanied by five Indians in a small boat he spent several weeks in the wilderness on this duty, and has written a book on the results of this survey, to which is added chapters on the discovery of the Columbia and the development of the country drained by it.

MAJOR DAN C. KINGMAN.

Lieut. Symons was next sent to the Mississippi river and spent a considerable portion of time in carrying out works for the improvement of that portion of the river between Memphis and the mouth of the Ohio. While on this work he was selected for duty under the department of state to act in conjunction with certain Mexican officials in making an examination of the international boundary line between the United States and Mexico. This hard task was successfully accomplished, and for his part in it Lieut. Symons received the official thanks of the Hon. Frederick Frelinghuysen, secretary of state.

Having finished with the Mexican boundary work, Lieut. Symons was detailed as superintending engineer of the great works in progress for increasing the water supply of Washington, D. C. This work consisted of a dam across the Potomac at the Great Falls, an acqueduct tunnel four miles long and a reservoir holding 300,000,000 gallons of water. Before this work was completed, Lieut. Symons was ordered to report to the late Gen. William Ludlow, then engineer commissioner of the District of Columbia, as assistant. On this duty he spent a number of years, having direct charge in turn of all the municipal engineering work of the district, water supply, sewerage, paving, road building, lighting, street cleaning, bridges and railroads. He was made a captain in 1884 and was married the same year to Miss Letitia Robinson of Philadelphia.

In 1889 he was ordered to Portland, Ore., to take charge of several works of river and harbor improvement on the Pacific coast. Six years were spent on this duty, during which Capt. Symons' district was gradually extended until it embraced nearly all the rivers and harbors in Washington, Oregon, Idaho and Montana. Besides his regular official duties, Capt. Symons was the designer and chief engineer of a great canal and harbor improvement scheme at Seattle, Wash., the idea of which was to cut a ship-canal from Puget Sound to Lake Washington, a beautiful and deep fresh water basin only 2 miles away from the salt water of the sound. The material excavated in the construction of the canal was to be used in filling a large area of tide flats, thus furnishing to Seattle a great and much-needed section of level land suitable for city purposes, and for railroads, wharves, etc., etc. This work is still going on with Major Symons as consulting engineer.

In 1895 Capt. Symons was ordered to Buffalo to the charge of the river and harbor district centering there. At this time the subject of the breakwater extension at Buffalo was in controversy and there were some decided differences of opinion in regard to it. All difficulties and differences were finally obliterated, and Capt. Symons made the plans for the magnificent structure now being built there, and the means for building being provided in 1896, a contract was let for the work to Hughes Bros. & Bangs of Syracuse, and it was started in 1897. Promotion to major in the corps of engineers came to Capt. Symons in 1896. Besides the works at Buffalo, Major Symons has charge of the harbor of Dunkirk, where an excellent harbor was made by excavation and breakwater building at a cost of over $400,000. Pennsylvania's beautiful harbor of Erie on Lake Erie, has been under the charge of Major Symons for the past six years. During this time it has been greatly improved by deepening the entrance channel and interior basin near the wharves, by extending the north pier of the entrance channel and putting a new concrete superstructure on a portion of this same old pier, by building jetties to control the sand movements along the lake side of the peninsula and by promoting plant growth on the neck of the peninsula and thereby tending to promote its stability. Major Symons has also done a large amount of work in the Niagara river leading to and at Tonawanda and still further down the river to Niagara Falls. On the Ontario coast, Major Symons has charge of the harbors of Wilson, Olcott, Oak Orchard, Charlotte, Big Sodus, Little Sodus, Pultneyville and Oswego; and of Cape Vincent and Ogdensburg on the St. Lawrence river and the general improvement of this river by removing shoals, etc.

Major Symons' principal work on the lakes has been the designing and building of the new breakwater and repairing of the old one at the busy port of Buffalo. In this work a number of new features in breakwater construction have been adopted. Notably is this the case in the stone portion of the structure, which is to be 7,300 ft. long. In this the hearting or nearly half of the entire structure is of gravel, costing but 13 cents a cubic yard in place. The saving on this enables the entire structure down to a depth of 15 ft. to be covered with a gigantic paving of carefully-quarried and selected capping stones, averaging over 6 tons weight each.

In the new north breakwater, just completed, and which is 2,200 ft. long, the substructure is of timber crib work filled with stone and it is capped with a concrete superstructure. This concrete superstructure is of novel design, being simply a shell of this material filled with ordinary rubble stone, the whole costing not more than if built in the old ordinary manner on the lakes of pine crib-work filled with stone, while in qualities of strength and endurance it far excels it. This same concrete shell construction was used in the repair of a portion of the old timber crib breakwater, and is being used in putting a new superstructure on the Stony point timber breakwater where wrecked last year by the tail end of the great Galveston storm.

Among Major Symons' most important contributions to the interests of the great lakes are his investigations into and reports on canals from the lakes to the sea. In 1897 he made a report to the government on this subject which is full of facts and in which the conclusion is reached that a canal capable of passing barges of 1,000 to 1,500 tons capacity is the best solution of the problem, far preferable to a canal capable of passing the large lake vessels, and still more so than a canal capable of passing ocean vessels. This report attracted so much attention and was of such importance that Gov. (now President) Roosevelt asked Major Symons to serve as a member of an advisory board to consider and report upon the proper course for New York state to pursue in regard to its canals. For his long and voluntary services on this board he received the public and official thanks of Gov. Roosevelt. During the past two years, Major Symons has been one of the consulting engineers of the state of New York on the work of making surveys and plans for the enlargement of its canals in accordance with the findings of the advisory board above mentioned.

Besides his work as engineer in charge of river and harbor improvements, Major Symons is the engineer of the tenth lighthouse district, embracing the Detroit river, Lake Erie, the Niagara river, Lake Ontario and the St. Lawrence river. The headquarters of this district were for many years at Cleveland, but in 1898 the duties were assigned to Major Symons, who immediately took the necessary steps and now has completed at Buffalo a fine and commodious lighthouse depot, with shops and facilities for storage and repairs of all kinds. Major Symons planned and is now building an elaborate and expensive lighthouse and fog signal station out in Lake Erie at the outer end of the straight channel leading into Toledo. At this station the illuminating and fog signal apparatus will be of a new design differing from anything else in the district. The light will be a "lightning light," flashing red and white every ten seconds. The fog signal apparatus will consist of oil engines and air compressors operating a siren. The apparatus for this station was one of the government exhibits at the Pan-American; $100,000 was appropriated for the station. Plans are now prepared and contracts will soon be let for two new lighthouse and fog signal stations, one at the south entrance to Buffalo harbor, the other at the end of the new north breakwater at Buffalo. Two lighthouses are now being built to mark the ends of the new breakwater at Cape Vincent at the head of the St. Lawrence river. Under Major

Symons many changes and improvements have been made in the lighthouse structures and apparatus, greatly benefiting the interests of navigation.

MAJOR DAN C. KINGMAN.

Major Dan C. Kingman, who was assigned to the Cleveland district a little more than a year ago, has commended himself to the business interests of Cleveland by the energy which he has displayed in furthering projects calculated to develop the commercial importance of the city. One of his first acts was to indorse the report of Col. Jared A. Smith favoring the extension of the Cleveland breakwater to the westerly limits of Gordon park. He has also devoted considerable attention to a readjustment of the basis of calculating the low water stages of the lakes, a work which is under the special direction of Major W. L. Fisk of Detroit. Major Kingman was born in New Hampshire in 1852 and graduated from West Point in 1875, the second in his class. He was commissioned as second-lieutenant of engineers upon his graduation, became first-lieutenant in 1879 and captain in 1886. He reached the rank of major in 1897. Major Kingman served with the United States battalion of engineers from graduation until 1878. He took part in suppressing the railroad riots of 1877. He was on duty at West Point as instructor of civil and military engineering in 1879-80 and as assistant professor in 1881. He was engineer officer of the military department of the Platte from 1881 until the close of 1886. He made many surveys and reconnaissances in the department and was specially selected by Lieut.-Gen. Sheridan in 1883 to take charge of the construction of roads and bridges in the Yellowstone national park, being the first engineer appointed for this duty. He explored the park and prepared a general plan for its improvement which has ever since been adhered to. He built many bridges and miles of road in the park and was retained an extra year on this duty at the request of Secretary Lamar of the interior department. At about the close of 1886 Capt. Kingman was placed in charge of the fourth district of the Mississippi river from Warrenton (a short distance below Vicksburg) to the head of the passes, for the purpose of its improvement and the construction and repair of levees, and the special work on the river, the improvement of the harbor at New Orleans, the Mississippi river at Natchez and Vidalia, the mouth of the Red river, and the rectification of the Red and Atchafalaya rivers and the protection works at the head of Bayou Plaquemine. In connection with these works he disbursed nearly $1,250,000. During the high water of 1890, which was of unprecedented height, he was charged with the protection of all levees in the fourth district and the prevention of overflow. In recognition of his services in this connection the following resolution was adopted jointly by the senate and house of representatives of Louisiana:

"Whereas, Dan C. Kingman, captain of engineers of the United States, rendered to the people of this state, and especially of that portion of our state subject to the overflow, valuable and important services during the flood period of the year; and whereas, his services in the protection and maintenance of the levees were marked by professional ability, a thorough and masterly knowledge of the system itself and a comprehensive appreciation of the duties of his office; and, whereas, at all times and under all circumstances he was at his post of duty doing all that science, skill, energy and work could do, therefore be it

"Resolved by the senate, the house of representatives concurring, that a vote of thanks be tendered Capt. Dan C. Kingman for the splendid service he rendered our state during the high-water mark of 1890; that an engrossed copy of this resolution be forwarded the secretary of war for transmission to Capt. Kingman."

The adoption of such a resolution by a state legislative body is a most unusual circumstance. At about the end of 1890 Capt. Kingman was transferred to Oswego, N. Y., and placed in charge of the defensive works of Fort Niagara and Fort Ontario, and of the improvement of all the harbors of Lake Ontario, east of Oak Orchard. In the spring of 1891 he visited San Francisco as a member of the board to examine and report upon the Sacramento and Feather rivers. In the fall of 1895 he was placed in charge of the Tennessee river and its tributaries with station at Chattanooga. In the spring of 1898 he was placed in charge of the improvement of the Cumberland river in addition to his other duties. In the spring of 1901 he was placed in charge of the Cleveland district.

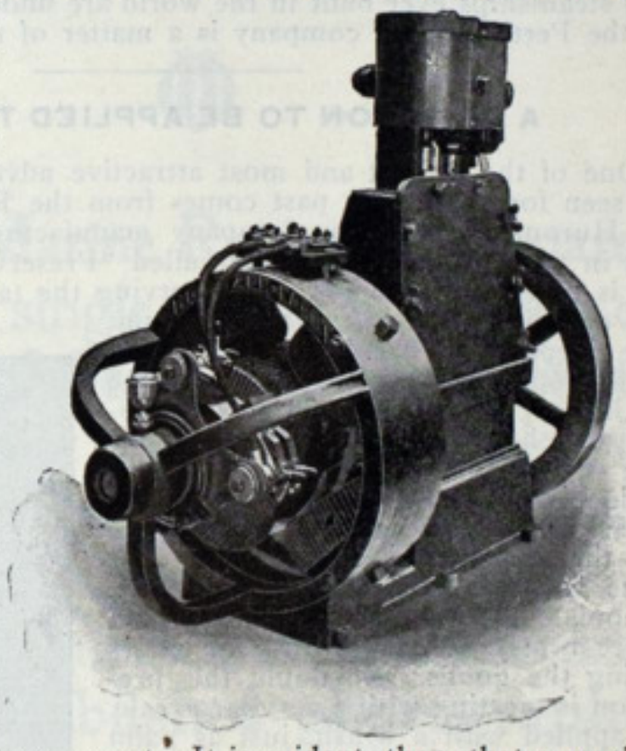
NORTH GERMAN LLOYD'S YEAR.

The directors of the North German Lloyd Steamship Co., in their report for the year 1901, state that although good results were realized in the first half of the year, the second half was prejudiced by the serious fall in freights in the North Atlantic traffic, owing to the superabundance of steam tonnage offering, and to the shortness of the American maize crop. In other lines, too, especially in the East Asiatic and Argentine services, the low rates of freight and the falling off in the European export trade in these directions greatly reduced profits. These deficiencies could only be partially counterbalanced by increased earnings in the passenger service. The balance of income over expenditure is 23,064,024 marks, 15 pfennige. Of this amount 2,000,000 marks are added to the insurance fund, and after various outgoings are provided for, and the sum of 11,829,246 m. 25pf. is written off for depreciation, a surplus of 5,345,407 m. 60 pf. is left, and is disposed of in the following manner: 5 per cent. made over to the reserve fund (266,416 m. 70 pf.), a 4 per cent. dividend on 80,000,000 m. (3,200,000 m.), 6 per cent. allowance to the board of directors (111,715 m. 05 pf.), and an extra dividend of 2 per cent. (1,600,000 m.), amounting altogether to 5,178,131 m. 75 pf., and leaving 167,275 m. 85 pf. to be carried to the new account.

In dealing with the different services maintained by the company, the directors state that the fall in freights in the East Asiatic line was to a great extent compensated for by the repatriation of a portion of the German troops from China. As regards the branch lines connecting with the imperial mail steamers in the far east, good business was done in the East Indian coasting services, and in the traffic between Singapore and Bangkok foreign vessels had sometimes to be chartered to cope with the quantity of cargo offering. For the Hong Kong-Sandakan (Borneo) branch line a new steamer is to be built, and a new service is to be opened between Singapore and Macassar-Menado-Gorontalo, which is expected to turn out very profitable. In the Chinese coasting trade things were quiet and one boat was withdrawn from this service, but the four vessels running on the Yang-tsze were occupied all the year round. Besides this, the North German Lloyd is now jointly interested with the Hamburg-American line in the working of the two steamers on the Yang-tsze purchased from the Rickmers company. The number of boats of the North German Lloyd employed in Indian and Chinese waters is forty-six, having a total measurement of 64,717 tons gross register. The mail steamer line to Australia was changed from a monthly to a three-weekly service last autumn, and the directors complain of the difficulties placed in the way of this service by the Australian customs authorities. The branch line to the Caroline and Ladrone islands in connection with the Australian mail steamers has not been profitable, and the Sydney-New Guinea-Yap-China service was consequently dropped at the close of 1901, and in its place a steamer will in future run every sixth week from Singapore to Sydney via New Guinea and back. A good normal passenger business was done on the North American route, but homeward cargoes were small owing to the reduced shipments of maize, and for outward cargoes only poor rates of freight were obtainable. The traffic with Argentine ports was unsatisfactory, but in the Brazilian service the boats found good employment. The Cuba and Mexico line, started in November last with monthly departures, has proved successful, and is to be changed to a fortnightly service. The results from the working of the Mediterranean line were not good, owing to the rivalry of competing lines. The number of passengers conveyed across the ocean by the company's boats last year was 305,530, and the quantity of cargo carried in the various lines amounted to 3,419,710 cubic metres. A good many cases of damage to vessels occurred during the year, and as the boats are partially insured by the company a sum of 68,922 marks had to be withdrawn from the insurance reserve fund. Two boats were sold at satisfactory prices, but ten steamers of various sizes were added to the fleet, and nine others are now being built in different yards. The directors abstained from making the addition of 10,000,000 marks to the share capital voted by the shareholders in March, 1901, but they now ask for powers to make a further issue of 10,000,000—or 20,000,000 marks in all—thus bringing up the total to 100,000,000. The directors add that if this proposal is ratified they will be able to carry out their financial plan for the next few years, including the acquisition of new boats, and no further increase of capital will be necessary for a long time to come.

GAS ENGINE IGNITER.

The Holtzer-Cabot Electric Co. of Boston, Mass., has recently designed and placed upon the market a new gas engine igniter of the dynamo type, which presents some novel and distinctive features, the most important of which are found in the fact that it does not require the use of a spark coil and is quite independent of speed, the latter feature overcoming the great objection to the dynamo type of igniter. There have been of late great advances made in the size of gas and gasoline engines, while the best practice seems to incline toward the multiple cylinder. These engines, by reason of the nature and volume of the body of gas to be ignited, the high frequency of the spark and also on account of peculiarities in the construction of the make-and-break device, require a large and practically continuous flow of current to produce satisfactory ignition.



It is well known that the strength of magnetization obtainable in the best permanent magnets is for a given weight relatively quite small in comparison with that which may be secured with an electro magnet. It is evident, then, that a machine of the permanent magnet type constructed to deliver any considerable amount of energy would be unnecessarily large and heavy. This igniter has been, therefore, made of the dynamo type for the reasons given. It weighs 19 lbs., and will, if necessary, deliver continuously a maximum output of 50 watts.

As stated, the dynamo is practically independent of speed and at 1,000 revolutions per minute will deliver ample current for satisfactory ignition, while the speed may be increased to 2,500 revolutions per minute without any danger from burning out. Thus the igniter may be driven from the fly wheel of the engine with the ordinary belt or friction pulley.

The field core is of a solid casting of soft steel, and the armature is of the drum type carefully laminated and wound with double silk covered magnet wire. The shaft is of high grade steel and the bearing sleeves are of phosphor bronze. The brush holders and commutator are large and heavy, while the brushes are of a special composite structure, combining the substantial qualities of carbon with the higher conductivity of the copper.

The machine is rendered quite impervious to dust and moisture by a protecting shield, which fits over the commutator and brushes. This may be easily removed, making the brushes and commutator readily accessible. The body of the machine is mounted on a light hinged base in such a manner that a wide range of adjustment may be effected without using sliding contacts or clamping nuts.

Mr. Harry W. Bates of Boston, a member of the New York yacht club, has chartered, through the office of Frank N. Tandy, Boston, the fast steam yacht Neckan, owned by H. C. Baxter of Brunswick, Me. The Neckan is 115 ft. water-line length, and is a very comfortable boat. Mr. Bates will use her for cruising purposes along the New England coast during the present season. The yacht is now being fitted out at McIntosh's basin, South Brooklyn.

SUPERINTENDENT OF THE PERTH AMBOY WORKS.

The Perth Amboy Ship Building & Engineering Co. of Perth, Amboy, N. J., has secured in Mr. Charles Schofield a ship yard superintendent of varied and valuable experience. He has been connected with several of the principal yards of the Atlantic seaboard and the great lakes and has had to do with the construction and repair of all kinds of vessels. Mr. Schofield was born in London in 1858. He belongs to a family of ship builders. His father was a ship builder. His brother conducts a yard at Grimsby, England, and is the owner of several valuable patents of a ship building kind. His apprenticeship of seven years, begun when he was fourteen years of age, was served at Hull, England, with the Messrs. Earles Ship Building & Engineering Co., one of the finest concerns in the world. He had the advantage of evening classes connected with these works, in which the apprentices are given a knowledge of naval architecture as an adjunct to their practical training. Upon completion of his apprenticeship he purposely drifted, as a workman, from one yard to another in Scotland so as to gain a knowledge of different systems in different yards. He came to this country in 1880 and was employed on the lakes by the Detroit Dry Dock Co. at their Wyandotte works and later by the King Bridge Co. of Cleveland, in which latter position he profited by experience on a great variety of structural work. In 1889 he went to F. W. Wheeler & Co. of West Bay City, Mich., and was there during the period when the large yard at that point for the building of steel vessels was laid out and while the steamers City of Chicago, Emily P. Weed, Mackinaw and Keweenaw and the car ferry Michigan were under construction.

In 1891 Mr. Schofield went to Bath, Me., and was with the Bath Iron Works while the Machias, Castine and Ammen ram Katahdin were building for the government, and also while the well-known steamer City of Lowell, for the Norwich & New York Transportation Co., and the Slater yacht Eleanor, a very fine craft, were under construction. From 1894 until 1897 Mr. Schofield was at the works of the Harlan & Hollingsworth Co., Wilmington, Del., where some very successful coasting passenger and cargo steamers, as well as steam and sail yachts, were built during that period. Later he was with the William Cramp & Sons Co. of Philadelphia, and still later he was superintendent for the Eastern Ship Building Co. at New London, Conn., where two of the largest passenger and cargo steamships ever built in the world are under way. His engagement with the Perth Amboy company is a matter of recent date.

A SOLUTION TO BE APPLIED TO CANVAS.

One of the neatest and most attractive advertising circulars that we have seen for some time past comes from the Robeson Chemical Co. of Port Huron, Mich. This company manufactures, as has already been noted in these columns, a liquid called "Preservo," which in the marine trade is especially intended for preserving the tarpaulins that are used as hatch coverings. A very large amount of the preparation has been sold within the past couple of years to vessels of the great lakes. The manufacturers have secured neat half-tone engravings of some of the vessels that are using "Preservo," and side-by-side with the pictures in the circular they have printed testimonials from the captains of the vessels. The scheme is very well carried out. The testimonials are of an enthusiastic kind and are nearly all in the form of letters ordering the goods. No doubt this preparation is meeting with a very large sale. It is applied with a brush, just as paint would be applied. The manufacturers claim that it is a perfect water-proof and weather-proof protection for cotton duck; can be used in any climate; is not affected by heat or cold, salt or acids; will not crack, scale, freeze, stick, mould, rot, mildew or admit water, and that it renders cotton duck soft and pliable.

Mr. W. B. Robeson says that before he was satisfied with the preparation now known as "Preservo" he spent eight years in trying to get up for water-proofing canvas a solution that did not contain oil. He was for several years a chemist with the Standard Oil Co. and made this preparation a special study. Oil had been used on canvas but without success. Oil causes rot, he says, in cotton fiber, destroying the vitality and life of it. He says also that it is generally known that oil makes cotton duck stiff and very inconvenient to handle, and when folded or creased a few times the canvas breaks or cracks, thus admitting water and making the canvas when used as a covering useless as a weather-proof protection. He says further that oil is also subject to climatic or atmospheric conditions. In freezing weather it contracts and becomes rigid, while under torrid conditions it expands, becomes soft and sticky, and is very difficult to handle. "Every positive has its negative," says Mr. Robeson, "and for years we have striven to produce a negative for water that did not contain oil. In compounding Preservo we have not only succeeded in discovering an entirely new negative (or opposite) to water, but we have also found an affinity for cotton, which, when applied, is immediately absorbed into the innermost core of every fiber. Repeated tests have proven that this solution is retained by each individual fiber during the entire life of the canvas. One of the best features of the solution is the fact that it makes cotton duck much softer and more pliable than is the duck in its natural form and at the same time it adds strength and durability to the fibers. Old tarpaulins treated with it will wear longer than new ones without it."

Mr. Robeson has other business interests and the Robeson Chemical Co., in which Mr. B. J. McCormick is the active worker, was therefore organized for the manufacture and sale of this preparation.

DULUTH-SUPERIOR HARBOR RULES.

Capt. D. D. Gaillaird, United States engineer at Duluth, directs attention to changes in the government regulations regarding the towing of rafts in Duluth-Superior harbor and the entrances thereto, as follows:

1. No vessels shall be moored to any United States pier.
2. No material of any kind shall be unloaded onto or loaded from the United States piers, except for the use of the United States, unless by special permission of the engineer officer-in-charge in each case.
3. Vessels shall not anchor in the entrance canals, or in any of the navigable channels, except in the harbor basins, and then only where not in the way of passing vessels.
4. Vessels and rafts shall not be anchored or otherwise fastened where they will be liable to swing into the channels by reason of a wind or current.
5. Vessels and rafts shall take great care not to run into, strike, rub against or otherwise injure the United States piers, buoys or beacons in the harbor.
6. While dredging operations and the rebuilding of the piers are going on, all vessels will slow down to six miles an hour, while passing said piers, or the dredges, upon being requested to do so by the display or waving of a red flag, or red lantern.
7. Dredges and attending scows and tugs are expected and required to give half the channel for passing vessels and rafts, and the latter are required to do the same when passing the dredges or other craft.
8. The signal for opening the draws of all bridges will be three long blasts of the whistle, or horn where the vessel is not navigated by steam power, and will be given in ample time when approaching the bridge. The only exception to this is when a vessel going into St. Louis bay from Superior bay intends to pass through the Wisconsin draw of the Northern Pacific bridge; it will then add one short blast after the three long blasts.
9. Upon such signal being given, the keeper of the drawbridge, which is signalled, will open it promptly and fully, and will give all vessels right of way over all trains, cars, wagons, foot passengers, etc.
10. Where there are two ore more channels leading to a given point, in one of which improvement work is going on, it may be temporarily closed to navigation by the engineer officer-in-charge, after due notice.
11. All rafts which enter or leave the harbor by the Wisconsin entrance shall be made up into pockets, by connecting the outside boom-sticks with cross boom-sticks at distances apart not exceeding 275 ft. The cross-booms must be of such lengths, and the pockets so filled that the maximum width of any one pocket shall not exceed 200 ft. while passing through said entrance. The total length of the raft shall not exceed 2,000 ft. Rafts must be handled by a sufficient number of tugs to give at least 150 ft. of clear passage-way on one side, for passing vessels.
12. All rafts which enter or leave the harbor by the Duluth canal shall be made up into pockets, by connecting the outside boom-sticks with cross boom-sticks at distances apart not exceeding 200 ft. The cross-booms must be of such length and the pockets so filled that the maximum width of any one pocket shall not exceed 125 ft. while passing through said canal. The total length of the raft shall not exceed 1,400 ft. Rafts must be handled by a sufficient number of tugs to keep at least one-half of the canal clear, i. e., no part of the raft will be permitted to extend over the center line, or axis, of the canal while passing through the same.
13. No raft using the channels dredged by the United States in Duluth-Superior harbor, must exceed the dimensions given in sections 11 for the Wisconsin entrance.
14. All rafts in passing the bridges will use the rafting spans, and will not be permitted to go through the draw span openings.
15. Rafts at all times will be handled by sufficient number of tugs to enable them to avoid obstructing the channels, and to give half the channel to passing vessels, or in passing dredges.

These regulations shall be in force from and after May 1, 1902.

COMPAGNIE GÉNÉRALE TRANSATLANTIQUE

FRENCH LINE—UNITED STATES AND EUROPEAN MAIL ROUTE.

New York to Havre-Paris in less than one week.
Steamers sail from New York every Thursday, at 10 a. m.
Company's own vestibuled train from Havre to Paris in four hours.

FLEET 70 STEAMERS.

In New York service the following gigantic Twin Screw Steamers:							
"LA LORRAINE"	(new)	Twin Screw		15,000	tons	22,000	H.P.
"LA SAVOIE"	(new)	"	"	15,000	"	22,000	"
"LA TOURAINE"	(modern)	"	"	10,000	"	12,000	"
"L'AQUITAINE"	(modern)	"	"	10,000	"	16,000	"

Naval officers command above steamers, insuring the same strict discipline as on a man-of-war. These ships all have double bottoms and water-tight compartments, and prescribed routes are taken to avoid fogs. The above steamers contain every modern twentieth century equipment for safety, most luxurious accommodations, and the cuisine is famous. The favorite route of the elite of both continents. For rates, plans and other particulars apply to

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"BENEDICT-NICKEL" Seamless Condenser Tubes
are the only ones that resist electrolysis.
Far superior to brass or copper.
Our treatise on "Electrolysis of Condenser Tubes" tells why—send for it.

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New York, 253 Broadway. Boston, 172 High St.

AVERAGE LOSS IN TORPEDO DESTROYERS.

The board of naval officers, of which Rear-Admiral Francis M. Ramsay was chairman, appointed by Secretary Long to fix the amounts lost by contractors in constructing torpedo boat destroyers and torpedo boats for the government, has reported that the average loss on each destroyer was $87,459 and on each torpedo boat $72,531. The total loss of the contractors on the sixteen destroyers, as fixed by the board, was $1,399,340, and on torpedo boats $652,778, a grand total of $2,052,118. These figures will be sent to congress for its information in considering claims of the contractors for reimbursement to the amount of one-half their losses, or $1,026,059. The board's report was referred to the bureaus of steam engineering and construction, which informed the secretary of the navy that they regard the average cost fixed by the board as fair and moderate. They say that the excess of cost over the contract prices to which the contractors were put was due to an increase in the price of material and the long periods that the vessels were under construction.

The Engel & Fagersten Chemical Co. of Chicago, under date of March 27, received the following letter from the technical department of the North German Lloyd Steamship Co.: "Referring to your kind favor of Dec. 9, we are glad to state that the anti-fouling compound furnished by you has given extraordinarily good results in all the steam boilers on board of our ocean liners, which has caused us to continually re-order the same from you. We furthermore beg to state that since we have used your compound the cleaning of the boilers has been greatly facilitated, since those parts exposed to the fire are being much less incrusted with scale than formerly. Your compound is now being used by us on our entire fleet and we can gladly recommend the same to everybody using steam."

Cabins and ..Staterooms

of modern vessels especially those in the passenger service should demonstrate the supreme possibilities of the wood finisher's art.

This demands a special varnish however, as atmospheric conditions are more destructive to varnish afloat than ashore and the ordinary article is of but little use.

The varnish best adapted to withstand the deleterious influences of wind, wave and weather is *"BERRY BROTHERS' SPAR VARNISH."*

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MANUFACTURERS OF
"THE ADMIRAL" ANCHOR.

THE LATEST AND BEST STOCKLESS ANCHOR.
APPROVED BY LLOYD'S.

ANCHORS CAST AND TESTED ON ORDER, OR STOCK ORDERS PROMPTLY FILLED.

A GUARANTEE OF QUALITY.

OPEN-HEARTH STEEL CASTINGS OF THE HIGHEST GRADE.

FACILITIES FOR CASTINGS UP TO 80,000 POUNDS WEIGHT.

MACHINE WORK AND PATTERNS FURNISHED WHEN REQUIRED.

RAIL OR WATER DELIVERIES.

CAPACITY, 1500 TONS PER MONTH

Seaboard Steel Casting Co.,

CHESTER, PA.

OWNERS, Masters and Engineers of Lake Vessels may be interested in securing photographs of their ships. Possibly an owner would like a portfolio containing photos of every ship which he owns; probably masters and engineers would like a little album containing photos of the vessels in which they have sailed—in other words a photographic story of their life work.

The Marine Review is prepared to furnish single prints of vessels or portfolios of fleets. It has a pretty thorough list of active vessels, of docks, elevators, coal and ore handling machinery, etc., some the product of its own camera and others secured through established photographic agencies.

The price at which we furnish photographs is very low.

If you are interested call or write. If you call we will show you a portfolio of prints. Perhaps there might be one among them you would like.

THE MARINE REVIEW PUBLISHING CO.,
39-41 Wade Building.

"PRESERVO" WILL NOT CRACK, SCALE, FREEZE OR STICK—SEE PAGE 8.

A new sixteen-page ventilator catalogue of the Buffalo Forge Co., Buffalo, N. Y., fully illustrated with half-tone engravings and describing in detail the many different types and sizes of ventilators manufactured by that company, is now ready, and any reader of the Review who is interested may secure a copy by writing for it. This company, with experience of a quarter of a century in the heating and ventilating of buildings of all classes, has become thoroughly in touch with the conditions which make stationary ventilators an efficient and most desirable apparatus. On this subject the manufacturers say: "While the requirements of a stationary ventilator are somewhat hard to fulfill, they have been met by our new Buffalo improved ventilator. The value of these ventilators when in use with the fan system, is too often under-estimated. In certain cases they are alone amply sufficient for proper ventilation. These ventilators are built of heavy gauge iron, and will resist any strain of reasonable magnitude to which they may be subjected. Many special interesting types are shown in the catalogue."

The compound marine engines, both fore and aft and vertical tandem, as built by Marine Iron Works, station A, Chicago, have met with considerable favor on the Atlantic and Gulf of Mexico coasts, that company having built eighteen sets of them for those waters so far this year. 4

Lloyd's Agency at Cleveland Vacant.

Applications will be received for the position of Lloyd's agent at Cleveland by the Secretary of Lloyd's, London, E. C., until July 1, 1902.

Treasury Department, U. S. Life-Saving Service, Washington, D. C., April 19, 1902. Sealed proposals will be received at this office until 2.00 o'clock p. m., of Tuesday, May 6, 1902, and then publicly opened, for the construction of a wharf for the Old Chicago Life-Saving Station, Chicago, Illinois. Specifications and drawings, forms of proposal, etc., can be obtained upon application to the Superintendents of Construction of Life-Saving Stations, 17 State Street, New York City; Assistant Inspector 12th Life-Saving District, Room 543 Rand-McNally Building, Chicago, Illinois; or to this office. S. I. KIMBALL,
Apr. 24. General Superintendent.

U. S. ENGINEER OFFICE, Jones Building, Detroit, Mich., April 19, 1902. Sealed proposals for dredging, and other work required for removing obstructions to navigation in main Ship Channel, between Sault Ste. Marie, Mich., and Lake Huron, will be received here until 12 noon (Standard time), May 19, 1902, and then publicly opened. Information furnished on application. W. H. BIXBY, Major, Engrs. May 15

To Ship Owners and Naval Architects.

Energetic young man with twelve years' steel ship building experience (seven years ship yard and five years drawing room) is open for engagement as inspector of hull construction—tugs, barges, passenger and cargo liners. Versed in modern economical practice. First-class references. Address Inspector, care Marine Review Pub. Co., Wade building, Cleveland. April 24.

Compound Marine Engine for sale.

One fore-and-aft compound marine engine. Cylinders 16 and 32x30. In good condition; practically new. Will be sold cheap.
RIVER MACHINE & BOILER Co.,
May 1. 108 to 114 River st., Cleveland, O.

Tug For Sale.

Wood hull, 61 ft. long, 14 ft. 8 in. beam. Iron house. Engine 16¼x18 in. Boiler pressure allowed, 140 lbs. Thoroughly overhauled this winter and ready for immediate use. Inquire C. H. Strong & Son, No. 622 Cuyahoga Bldg., Cleveland. May 1.

Boat Wanted for Lumber Trade.

WANTED—By a concern on the Atlantic coast about 500 miles south of New York, a good responsible shipping firm who can furnish an A1 boat to carry lumber by the thousand to New York and Boston. The mill to guarantee prompt loading and unloading, and work the entire year round. Would make regular charter with these guarantees specified. Would want boat to carry about one million feet at a load. Please give name of boat you furnish, with all particulars. Also rate she will insure at. Address Cape Fear Lumber Co., Wilmington, N. C. Reference—Mercantile agencies. April 24.

Tugs Wanted.

Wanted—To purchase or lease tugs of 65 to 80 ft. over all; engines 18x22 or 20x24, if low pressure; compound engines preferred. Must be in good order. Address Tugs, care Marine Review Pub. Co., Wade Bldg., Cleveland, O. tf

U. S. Engineer Office, 1637 Indiana Ave., Chicago, Ill., April 1, 1902. Sealed proposals for dock construction at Calumet Harbor, Ill., will be received here until 12 noon May 1, 1902, and then publicly opened. Information on application. O. H. Ernst, Lieut. Col., Engrs. April 24.

BELLEVILLE GENERATORS

Grand Prix 1889
Originated 1849

Hors Concours 1900
Latest Patents 1902

Number of Nautical Miles made each year by Steamships of the Messageries Maritimes Co., Provided with Belleville Generators—Since their Adoption in the Service.

Year.	Australien	Polynésien	Armand Béhic	Ville de la Ciotat	Ernest Simons	Chili	Cordillère	Laos	Indus	Tonkin	Annam	Atlantique
1890.....	67,728	2,460										
1891.....	68,247	68,331	204									
1892.....	68,247	68,403	69,822	23,259								
1893.....	68,379	68,343	68,286	68,247								
1894.....	68,439	68,367	68.574	68,439	37,701							
1895....	68,673	68,766	68,739	68,808	40,887	28,713						
1896.....	69,534	92,718	69,696	69,549	62,205	63,153	40,716					
1897.....	68,250	69,606	92,736	69,555	62,235	76,110	63,357	43,146				
1898.....	70,938	69,534	69,552	69,597	62,526	63,240	63,240	62,553	63,954	22,707		
1899.....	69,534	69,615	67,431	90,405	60,246	62,778	62,868	52,344	54,855	44,007	22,884	
1900...	69,534	67,494	69,744	69,564	61,719	62,382	62,502	51,471	53,373	62,016	63,066	52,140
1901.....	44,220	69,627	69,594	66,948	51,057	62,460	62,490	61,743	62,688	43,866	62,466	63,126
Total.....	801,723	783,264	714,378	664,371	438,576	418,836	355,173	271,257	234,870	172,596	148,416	115,266

ATELIERS ET CHANTIERS DE L'ERMITAGE, À ST. DENIS (SEINE), FRANCE.
WORKS AND YARDS OF L'ERMITAGE AT ST. DENIS (SEINE), FRANCE.
TELEGRAPHIC ADDRESS: BELLEVILLE, SAINT-DENIS-SUR-SEINE.